Winter 12-17-2021

Targeting Pre-Operative Booking Processes to Decrease Risks of "Never Events"

Rebecca Lynn Poths
University of San Francisco, rlpoths@usfca.edu

Rebecca Lynn Poths
University of San Francisco, txafrn@outlook.com

Targeting Pre-Operative Booking Processes to Decrease Risks of "Never Events"

Rebecca Lynn Stokes-Poths, DNP(c) RN-BC, BSN, MSHS, CJCP, CIC

University of San Francisco

Committee Chair:

Dr. Juli C. Maxworthy, DNP, PhD(c), MSN, MBA, RN, FNAP, FSSH

Committee Member:

Dr. Elena Capella, EdD, MSN/MPA, RN, CNL, CPHQ, LNCC

Table of Contents

**Multiple appendices were redacted for this version due to their confidential and proprietary nature.

Acknowledgements

It is with the most incomprehensible love and appreciation that I must acknowledge my team of constant encouragement: my GREATEST FAN who is the love of my life, and my absolute #1 supporter, my husband Herr Torsten Poths. Vielen dank mein Liebster, mein Schatz. My mother, my model and inspiration for what a nurse should truly be, Eulalia Marie Ogilvie-Stokes, LVN (retired), my sister Tracy Stokes-McCoy, and my brother Samuel Stokes.

To my chair, Dr. Juli Maxworthy, I cannot express my gratitude for your incessant reassurance, praise, and inspiration to pursue this project to improve quality and safe patient care within the perioperative setting. To Dr. Elena Capella, your kindness, and encouragement were second to none, and I appreciate your gentle way of correction which always helped me refocus on my true north. I know our entire cohort is so thankful for your guiding light, much akin to Florence Nightingale, always keeping that fire going to keep us moving forward. To USF cohort #10's Dr. Colonel Sherry Cox, USAF (retired) my forever cheerleader on speed dial for anything I needed. My Air Force recruiter in 1993, my mentor and guide to present day, thank you.

To my AMAZING team supporters from work. I will never be able to capture into words how your support from start to finish of this project will forever leave an indelible mark on my professional journey, and I thank you all so much. The hours of clear guidance through unchartered waters will never be forgotten.

My fabulous counselor and editor Susan Spencer. There simply are no words to express how you picked me up and helped me through this entire process. There are none finer, and absolutely *none* who care more than you.

"The hospital" with the incredible team support: Chief Nursing Officer, Chief of Medical Staff, Director of Perioperative Services, Director of Patient Care Services, Director of Quality

and Patient Safety, Surgical Services Liaison Nurse, Customer/Patient Experience Lead, Lead Surgical Scheduler, and to all surgical schedulers who participated. All of you enveloped me and supported me in every way possible to make this project so fulfilling.

This project and my DNP were pursued in honor of my dear friend, one of the greatest patient advocates, and perioperative nurse caregivers I ever knew, *always* ensuring "never events" *never* occurred, Deann Tisdale Douglas. You were taken from your patients, your family, and your friends far too soon.

Targeting Pre-Operative Booking Processes to Decrease Risks of "Never Events"

Abstract

Problem: Wrong patient, wrong procedure, wrong site, and wrong side surgeries are such egregious errors that are known as "never events." Root cause analyses can pinpoint a failure yet do little to determine if corrective action has reduced the risk of recurrence.

Context: Monitoring surgical cases prospectively to identify weaknesses that could help identify specific risk factors to avert and move toward zero defects. The setting for this quality improvement project is a >300-bed Level III trauma hospital, where the risk of wrong-site surgeries and lack of standardized processes in the surgical pre-operative booking process was of concern to organizational leadership.

Interventions: The project used The Joint Commission Center for Transforming Healthcare Safe Surgery Targeted Solutions Tool® (SS TST®) to identify, measure, and correct preoperative booking defects. Additionally, a pre/post intervention questionnaire was used to measure surgical schedulers' process satisfaction.

Measures: The outcome measures were changes in the number and types of pre-booking defects. Evaluation of surgical scheduler staff satisfaction began with existing workflow practices and concluded with workflow change evaluation.

Results: This project facilitated change in standardizing the perioperative process to decrease risk by 47%, a relative improvement of 53.4%, recognize scheduler concerns, and implement mitigating strategies.

Conclusions: Using the SS TST®, the hospital and the participating physician offices recognized the risk associated with booking surgical procedures via phone versus written submission. Standardizing online surgical booking improved surgical scheduler satisfaction.

Dissemination: The data was disseminated to the host facility, pilot test sites, and corporate leadership.

Key Words: surgical scheduling, preoperative booking, wrong-site surgery, “never events,” error, human factors, Safe Surgery Targeted Solutions Tool®

Section II: Introduction

Background

Wrong-site surgeries (WSS) consistently rank in the top five of the Joint Commission's annual evaluation of the most frequent sentinel events (The Joint Commission, 2020). When one of these surgical "never events" occurs, a hospital typically conducts a root cause analysis to pinpoint the hazards. It puts in place a set of policies or programs to reduce the risk of recurrence. Because these events are infrequent in any facility or hospital system and cannot be measured by incidence rates, it is rarely known if efforts put in place retrospectively have reduced the risk of the event happening again. Monitoring perioperative practices prospectively for weaknesses that *could* result in wrong-site surgeries rather than only looking back on what has occurred, can help identify risk factors so targeted risk mitigation practices can be implemented. Surgical procedures performed on the wrong patient, wrong site, or the wrong procedure (collectively known as wrong-site surgeries) can be catastrophic for patients, healthcare professionals, and healthcare systems.

Problem Description

More than 20 years ago, the National Academy of Medicine (NAM), formerly known as the Institute of Medicine (IOM) published the seminal report "To Err is Human" (Kohn et al., 2000), bringing the magnitude of medical errors to the attention of the healthcare profession and the public. Wrong-site surgeries, as "never events," receive outsize attention when they occur, yet the problem persists, with 40-50 WSS per week (~2400/year) in the United States (The Joint Commission, 2021). The unrealized problem at the hospital where the quality improvement project was implemented, was the lack of identification, measurement, and targeting of the risks which began with surgical scheduling, the entry point for pre-operative booking. Procedures

were booked via phone, fax, email, hand-delivered documents, or through a website, using various forms, notations, and unapproved abbreviations. With no standardized booking process and many points at which errors could be introduced, the hospital welcomed implementing a quality improvement study to measure and mitigate the risk of pre-operative booking defects at the beginning of the perioperative continuum.

No previous efforts at this institution to improve surgical scheduling had focused on pre-operative booking defects, as it had not been viewed as either high-risk for error or cause for patient dissatisfaction. The DNP project lead proposed to the Chief Nursing Officer, the Chief of the Medical Staff, and the Director of Perioperative Services using the Safe Surgery Targeted Solutions Tool® (Center for Transforming Healthcare, 2009). The tool defines, identifies, measures, and targets prioritization for preoperative surgical booking defect risks and it matches targeted solutions to improve, sustain, and spread the quality improvements. The first goal of this quality improvement project was risk mitigation. The second goal of this quality improvement project was improved job and process satisfaction for surgical schedulers, both in-hospital and in-office.

The surgeons alone were granted access to the scheduling template. The office schedulers then had to be "proxied" into this system by their surgeon, proving unwieldy and a source of frustration for the office staff and physicians alike. The Corporate Patient/Customer Experience Office has been working to implement a seamless, easy to access surgery booking capability. This new IT system upgrade will allow access to office staff to schedule surgeries and upload necessary orders and documents prior to patient arrival to Pre-Admit Clinic (PAC) and date of surgery in one step. Currently, this process is not a widely known option and has been a large source of frustration across the perioperative continuum.

Setting

The setting for this evidence-based change of practice project was a >300-bed acute care hospital with a Level III Trauma Center in Texas. Surgical schedulers in the hospital and the physicians' offices reported the pre-booking processes as difficult to deal with due to phone wait times which were often upwards of 30 minutes; the online booking system at physician offices was not user-friendly, and there were multiple entry points for surgical scheduling at the hospital. Three in-house surgical schedulers handled bookings for up to 500 surgeons from over 60 physicians' offices for 18 operating rooms, for an average of over 14,000 surgical procedures annually. Most physician office schedulers used the phone to book surgical procedures or used their own procedures and forms, which they faxed, emailed or hand delivered.

In the previous state, the Director of Perioperative Services and the Director of Patient Care sent multiple emails and texts during a patient's Pre-Admit Clinic appointment or the day before a scheduled surgery to confirm the case. Even if booking errors or omissions were discovered in time and could be corrected, surgical setups may have needed to be reconfigured, surgical sets reprocessed or discarded, and surgeries postponed or canceled—all adding to hospital operational costs, staff frustrations, patient and family dissatisfaction, and the possibility of jeopardizing patient safety by delaying the surgery. If not discovered, the booking defects themselves could be entry points for wrong-site surgery "never" events. A simultaneous study was implemented via the healthcare system's patient experience team to streamline the surgical continuum experience by standardizing the pre-operative process up to and including the day of surgery, due to pointed customer feedback where opportunities for improvement were noted.

This facility's mission is to advance health by providing expanded access to care with an unmatched focus on quality, safety, and exceptional service. The DNP project lead, the Director

of Perioperative Services, and the Director of Patient Care identified two gaps. First, as the healthcare system continued to prioritize safety, quality, and service, unidentified or unquantified risks left the organization vulnerable to sentinel events and associated liability. The commitment to provide a world-class experience and patient outcomes was undercut by less than stellar patient feedback. This patient feedback drove the hospital to streamline the pre-operative booking process concurrent with implementing the DNP project.

Specific Aim

The specific aim of the pre-operative booking defect quality improvement project was to reduce surgical booking defects transmitted from physicians' offices to the hospital by 20% within eight weeks. The broader objective of the project was to introduce a practical, evidence-based way to manage the risk of WSS proactively by identifying and attempting to correct preoperative booking defects.

Available Knowledge

PICO(T) Question

In the formula set forth by Melnyk et al. (2017), a PICOT question was created to reflect the project aim, inform the literature search strategy, evaluate the evidence, and guide the design and development of the project. The PICOT question for this project was: For surgical schedulers in hospitals and physicians' offices (P), how does identifying, quantifying, and correcting surgical booking defects (I), compared to current surgical booking practices (C), change the incidence of surgical booking defects and workflow/job satisfaction for surgical schedulers (O) eight weeks from the implementation (T)?

Search Methodology

A review of the literature was performed on the CINAHL, PubMed, EBSCO Host, and RefWorks databases. The search terms used were *surgical, scheduling, booking, errors, checklist, high-reliability organizations, operating room, robust process improvement, universal protocol,* and *human factors,* with the Boolean operators AND and OR. The inclusion criteria were peer-reviewed research and non-research articles published in English between 2000 and 2020, demonstrating evidence-based practices for inpatient or outpatient settings. The 20-year timeframe was chosen due to the paucity of evidence-based studies relevant to the PICOT question, and the choice to include seminal studies with outsize influence on the current body of evidence. Position papers advancing the interests of commercial entities and expert opinion-pieces lacking references to evidence-based practices were excluded. The initial search returned 615 articles. Inclusion and exclusion criteria were applied to limit studies to those that addressed the perioperative continuum and perioperative checklists, which brought the number of studies for further evaluation down to 464.

Further changing the inclusion and exclusion criteria to identify studies that addressed checklists and methods to decrease perioperative patient harm returned 87 relevant studies. By reviewing abstracts, the number of studies that were chosen for appraisal decreased to 45. Only three studies specifically addressed the evaluation of pre-operative scheduling. Using the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tools (Dang & Dearholt, 2018), 16 studies were of sufficient quality to be included in this review The evidence level and quality of the studies ranged from Level I A High to Level V C Low (Appendix A).

Integrated Review of the Literature

Six themes emerged from the review: a) the pre-operative booking process, b) perioperative checklists, c) strategies and tools for reducing the risk of error, d) human factors science, e) Lean Six Sigma (LSS) and Robust Process Improvement® (RPI) in healthcare, and f) high-reliability organization (HRO) tenets, all to help eliminate wrong-site surgery.

Pre-Operative Booking

Three studies (Brown et al., 2001; Clarke, et al., 2014; Wu and Aufses, 2012) focused on pre-operative booking in the perioperative continuum as a source of wrong-site surgery defects. All three called for a multidisciplinary team approach and standardized booking processes.

In a retrospective study, Brown et al. (2001) identified risks associated with surgical interventions at two hospitals and two free-standing surgical centers in a U.S. urban healthcare system. Investigators compared 30-day published surgical schedules with actual surgeries performed to identify discrepancies that could lead to errors. Seven areas of potential risk were identified, three of which involved aspects of scheduling and preoperative documentation. The project task force found a lack of uniformity in the scheduling forms used by physicians' offices and surgical schedulers, with inconsistent and incomplete information provided. Scheduling procedures reflected differences due to convenience, old habits, self-styled improvements, lack of protocol awareness, and lax enforcement of standard procedures if they existed. An improvement process was implemented with a single surgery scheduling form that met all site requirements and could be used to schedule procedures at any site in the healthcare system. Scheduling procedures were revised with the following points communicated and subject to enforcement: only written scheduling on the approved form would be accepted; an amended form must be used to correct errors, omissions, or make changes; incomplete forms or forms

with abbreviations for *left*, *right*, or *bilateral* would be returned. Copies of the new forms and explanations of enforcement were distributed to all physicians' offices and unit managers. A concurrent audit of all patients scheduled through the new preoperative process was conducted to evaluate the risk reduction strategies. Data collected revealed the persistence of inconsistencies from which an education, implementation, and monitoring program was developed. No data were reported on subsequent changes in compliance or reduction in wrong-site surgery incidence.

Clarke (2014) documented the effects of miscommunication between the surgeon's office and the operating suite on the occurrence of wrong-site surgeries. Data from a review of 541 wrong-site surgery procedures reported to the Pennsylvania Patient Authority from July 2004 to June 2013 revealed 59 (11%) to be due to incorrect or incomplete information from the surgeon's office, significantly higher ($p<0.001$ by the chi-square test) than 8% for the wrong site surgery registry. Information that was incorrect or insufficiently specific when scheduling or obtaining consent was the most common defect, cited in 50 of the 59 cases. Compensation for wrong-site surgery claims from the study that were brought to court and adjudicated averaged $158,560.

Wu and Aufses (2012) analyzed surgical scheduling errors identified through the medical event reporting system of a large U.S. academic and research medical center. Within 151 booking errors identified over a six-month period, the most common error was wrong side booking (55, 36%), followed by incomplete information (38, 25%), wrong approach (15, 17%), and wrong procedure (14, 9%).

Perioperative Checklists

In a non-research review of 13 published articles on using perioperative checklists, Spruce, (2014), synthesized several findings. One, the creation of a checklist is only the first step. A checklist is merely a tool, and safe surgery cannot be achieved without team interest in the tool and constant communication about its use. Two, an explanation of why the checklist was created and a demonstration of the checklist used for processes in and around the operative setting are necessary. Three, the checklist must be read and "checked" directly each time, without fail. Four, checklists have greater value for multidisciplinary surgical teams than when used for a process within a single discipline.

In a qualitative study to evaluate the effectiveness of checklist use in surgical settings, Conley et al. (2011), conducted semi-structured interviews with implementation leaders (n=2), surgeons (n=2), and an anesthesiologist in five Washington State hospitals. The hospitals selected were urban (n=2), suburban (n=2), and rural (n=1); they ranged in size from less than 10 to more than 20 operating rooms. All five hospitals had initiated a surgical checklist implementation process between December 2008 through January 2009. Interviews were conducted with implementation leaders in September and October 2009 and with surgeons in October and December 2009. Interviews were recorded, transcribed, and analyzed question by question to identify distinguishing factors in the hospitals' implementation processes. Results were refined in an iterative process and compared with findings from the investigators' previous implementation research processes. Investigators identified seven characteristics of highly effective safe surgery checklist processes: active leadership, pilot periods, deliberate enrollment in checklist rollout, extensive discussion and training, multidisciplinary communication, real-time coaching, and ongoing feedback. The investigators' original hypothesis, drawn from the

work of others, that effective checklist processes would be characterized by dedicated resources, frontline decision making, and local modification was not supported by Conley et al. 's study. The investigators emphasized the importance of behavioral factors in highly effective checklist implementation processes and the necessity for implementation leaders to clearly and repeatedly explain why and show how to use safe surgery checklists.

Treadwell et al. (2014) conducted a systematic review of studies that described experiences with surgical checklists and strategies for successful implementation. Thirty-three studies returned from a search of the MEDLINE, CINAHL, EMBASE, and Cochrane Database of Controlled Trials published between January 2000 and October 2012 were included in the review. All studies described actual use of either the WHO checklist, the Surgical Patient Safety System (SURPASS) checklist, a wrong-site surgery checklist, or an anesthesia equipment checklist. The findings confirmed the association of checklists with increased detection of potential wrong-site surgery errors, decreased surgical complications (e.g., unintended retention of a foreign object), and better communication among the surgical team. Strategies for successful checklist implementation that emerged from the review included engaging institutional leaders as safe surgery champions, encouraging staff feedback on checklist implementation, considering feedback for process and checklist adaptation, and avoiding redundancies in existing systems for collecting information (e.g., multiple collection points for the same information). All the studies were confined to processes and events within the surgical setting. None addressed pre-operative booking forms or the role a standardized booking process might play in decreasing surgical procedure errors in the perioperative continuum.

In a retrospective cohort study, Van Klei et al. (2014) investigated the extent to which reductions in mortality attributed to the implementation of the WHO Safe Surgery checklist were

related to checklist compliance. The study population was 25,513 adult patients undergoing non-day case surgery in a tertiary university hospital. Data were obtained from electronic patient records and hospital administrative data. The main outcome measured was in-hospital mortality within 30 days after surgery. Effect estimates were adjusted for patient characteristics, surgical specialty, and comorbidity. After adjustments for baseline differences, mortality was significantly decreased after checklist implementation (odds ratio 0.85 at 95% confidence level). The effect was strongly related to checklist compliance and full checklist completion (0.44 association at 95% confidence level). The underlying takeaway from the study was the need for full and consistent compliance with the WHO Surgical Checklist implementation to achieve the intended outcomes.

DeVries et al. (2010) investigated surgical safety interventions outside the operating room to establish if improvements in patient outcomes could be achieved by targeting the entire surgical pathway. The pre/post study examined the effect on patient outcomes of a comprehensive, multidisciplinary surgical safety checklist. The checklist was implemented in six Netherlands academic centers and teaching hospitals with high standards of care. Results were compared to a control group of five hospitals with similar characteristics. Outcome data were collected from the prospective Dutch National Surgical Adverse Event Registration System (LHCR), a nationwide registration system that has been in use for more than 10 years. Baseline data were collected over three months for both sets of hospitals. Post-implementation data were collected three months post-intervention. The total patient population studied in the six hospitals was 3760 patients before implementation and 3820 patients post-implementation. The total number of complications per 100 patients decreased from 27.3 (95% confidence interval) at baseline to 16.7 (95% confidence interval) for an absolute risk reduction of 10.6 (95%

confidence interval). In-hospital mortality decreased from 1.5% (95% confidence interval) to 0.8% (95% confidence interval), for an absolute risk reduction of 0.7 percentage points (95% confidence interval). Outcomes did not change in the control group hospitals. The investigators attributed the results to several factors, including the design of the checklist to incorporate all existing protocols and checks to provide a comprehensive framework for the surgical pathway. The continuity provided minimal information loss along the pathway and promoted interdisciplinary communication. Many processes were optimized in the participating hospitals by integrating discrete processes into a cohesive framework and standardization of protocols.

Paull et.al. (2014) explored why some wrong surgery events are not caught by the steps of the Universal Protocol for safe surgery. The purpose of the study was to identify potential safeguards to add precautions upstream and downstream of the surgical events that are the focus of the protocol. In a retrospective study design, the U.S. Veterans Health Administration database of root cause analyses was queried for all cases involving incorrect surgical procedures between 2004 and 2013 to determine the relative frequency and characteristics of wrong surgery events with origins upstream or downstream to the Universal Protocol. Events were sorted into the two subgroups (upstream or downstream) by two clinicians with expertise in surgery and patient safety. From the initial query return of 308 wrong-site surgery events, 48 cases (16%) were identified as upstream or downstream errors, and further analyzed. Upstream errors included mislabeling, while downstream errors were associated with ineffective surgical processes. Surgical procedures that were particularly vulnerable to upstream or downstream errors included wrong level spine operations, wrong patient prostatectomies, wrong implant cataract procedures, and wrong-site skin lesion excisions. The recommendation from the investigators to the healthcare industry is to engage in a complete assessment and

implementation of safe behaviors that complement the surgical continuum and not to rely on the Universal Protocol alone to ensure safe surgical procedures.

Clay-Williams and Colligan (2015) published a viewpoint paper in which they stated that large-scale implementation of tools such as the Universal Protocol checklist in the hospital setting is not as straightforward or effective as hoped or claimed. The authors argue that checklists in healthcare are best reserved for simple, easy to follow, standardized, and time critical processes. Expanding checklist use to complex and variable procedures may be confusing and require advanced skills and team commitment to sustain. Combining linear procedures (checklists) with complex processes (discussions) as attempted in safe surgery checklists contradicts what the aviation industry has done, as those two components never cross in the cockpit. Unlike aviation checklists, the Universal Protocol does not articulate clear roles for who should initiate and complete each step or define who is responsible for the checklist (such as the captain is inside the cockpit). In addition, the Universal Protocol does not afford individuals who may need to be performing other tasks the ability to do so. The authors warn that patient safety solutions will never be singular, straightforward, or self-sustaining given the complexity of quality improvement in healthcare.

Human Factors

Dr. Ronald Wyatt, medical director, Office of Quality and Patient Safety of The Joint Commission, evaluated the root cause analyses of all reported sentinel events (The Joint Commission, 2015). The three most prevalent findings related to errors were human factors, leadership, and communication. In Dr. Chassin's 2013 article, he identified that within root cause analyses, themes re-enforced the premise that the Universal Protocol, which focuses solely on the pre-op setting the day of surgery and the operating room, misses an important entry point for

errors. Chassin determined that those factors prior to the untoward event (such as pre-op booking) must be examined. Leaders must evaluate human factor solutions to create a more reliable tool to prevent that *never event* occurring again. Second, Chassin stated that US regulatory bodies are not likely to positively affect patient safety unless they include Robust Process Improvement® (RPI ®) (Appendix B). Chassin saw regulatory mandates that did not incorporate RPI® as potentially obstructing progress toward High Reliable tenets. Third, Chassin stated that High Reliability, as a systematically implemented process, requires an effort to discover the causes of the failures within patient safety by focusing on the specified root cause. Finally, Reason emphasized three key components for utilization when developing any tools for use within healthcare (1990). Reason recommended ensuring these elements of Human Factors are included within tools, by making sure they are knowledge-based, rule-based, and skill-based (1990).

Reason (2000) cited two theories for humans to be fallible, the actual *person* or the *system.* If the error is to be blamed on the *person,* there are the reasons for forgetfulness, intentionality, or moral weakness that can be revealed. Suppose the error is found to lie within the system. In that case, the explanations can be found in the conditions under which people are forced to work and try to build defenses to deflect error or the effects of their errors (often referred to as workarounds within healthcare). Reason states that healthcare should strive to move toward the High-Reliability Organization (HRO) goal of zero preventable harm by decreasing variability in human behavior.

Eltorai (2018) performed a qualitative study looking at aviation principles and lessons translated into healthcare. Eltorai drew parallels between aviation and anesthesia (as the principles of HRO do as well, in attempts to achieve zero preventable harm), looking at the crises

that both the pilot and physician are potentially faced. Both are often charged with saving lives and operating in a fog of unclear/incomplete direction. Eltorai stated that while many individuals tout HRO within healthcare, there are still factors missing which they believe will propel healthcare even farther toward zero preventable harm. One aspect highlighted here is that accident reporting and investigations in healthcare must shift from siloed "self-evaluation" by a risk manager within the organization where the mishap has occurred, to an outside agency performing the RCA. Instead of current practice, and with great insight, Eltorai shared the need for RCA decentralization from the organization itself wherein the members cannot be completely objective. RCAs should shift to a centralized mechanism and investigating body, paralleling the Federal Aviation Administration (FAA) accident investigation process.

Additionally, Eltorai included the benefits of simulation-based error analysis, which most facilities are now capable of performing by video-taping simulation scenarios to evaluate these errors in a no-harm, no-threat environment. This study offers a tremendous lesson learned in healthcare from aviation. This literature highlights the angles of incorporating human factors industries to afford systematic error review (Eltorai, 2018).

Robust Process Improvement®/Lean Six Sigma

In 2013, Dr. Chassin described the positive effects of the Targeted Solutions Tools® (TST®s) which utilize the change management strategies of RPI® with components included from Lean Six Sigma (LSS). The first TST® developed was with eight healthcare organizations evaluating hand hygiene, whereby RPI® (a compilation of Lean, Six Sigma and Change Management theories) was utilized with a noted 81% improvement with 11-month sustainment after implementation. Surgical booking prior to RPI® had a 39% error rate noting after RPI® there was a 21% error rate with a relative improvement of 46% (p= 0.000) in the article, Table 1

shows these *Improvements Seen in Four Projects Using RPI®*." (See Appendix C). Another component cited within this article, and demonstrating the success of the TST®s, is the adaptation and inclusion of High-Reliability Science into hospitals, with noted leadership commitment, the incorporation of principles and practice of a safety culture, with widespread deployment of performance improvement tools and methodology (Chassin, 2013).

Mason et al. (2014) reviewed 23 studies that evaluated LSS within healthcare. Six common goals were identified: 1) optimize outpatient efficiency, 2) increase operating room efficiency, 3) decrease complications associated with surgeries, 4) decrease inpatient-based harms, 5) reduce mortality, and 6) limit unrequired costs and lengths of stay within the hospital. The themes from these studies showed an 88% enhancement with LSS utilization and LSS quality improvement initiatives, strongly correlating outcomes for post-operative patients.

High-Reliability Science/High-Reliability Organizations

High-Reliability Organizations (HROs) are fashioned after the aviation industry, where zero failure can be tolerated. This HRO model is the direction experts are trying to drive healthcare. Chassin et al. (2018) discussed the implementation of High-Reliability tenets within healthcare, noting that Cincinnati Children's Hospital decreased their serious safety events by 80% and realized an 80% decrease in lost time days after implementing HRO strategies. In Houston, Texas, Memorial Hermann, The Woodlands, after implementing the HRO tenets, realized their hand hygiene rate which began at 55%, increased to a 96% compliance rate. This work then spurred a hospital within their enterprise to achieve zero bloodstream infections for 12 months and five facilities to achieve a 0% ventilator-associated pneumonia rate for a full year. These were all directly attributed to their improved hand hygiene from the utilization of HRO processes within healthcare. Noteworthy commonalities included: both institutions had great

support and a very involved board, a multitude of safety initiatives (which included safety huddles at hospital daily observation briefs), and both were consistently excellent, (safe across all services and settings) (Chassin, et al., 2018). These components are also seen woven throughout the SS TST® and are exemplified at the facility evaluating the SS TST®, whereby senior leadership is intimately involved, there are observable inclusion of safety initiatives within daily work, and patient and staff safety are a palpable priority.

Summary/Synthesis of the Evidence

Having multidisciplinary teams use a standardized written process for surgical scheduling was the single method whereby facilities noted sustained success in decreasing risk for 'never events' (Brown et al., 2001; Clarke, et al., 2014; Wu and Aufses, 2012). The impact of preoperative booking errors on wrong-site surgeries is well documented (Conley et al., 2011; Treadwell et al., 2014; Van Klei et al. 2014), while studies solely focused on the effect of non-standardized processes within pre-operative booking are lacking. The review of literature supported the need for consistent use of checklists (Spruce, 2014), the effects of human factors in using checklists (Reason, 2000), and the positive outcomes utilizing the tenets of Robust Process Improvement/Lean Six Sigma and High-Reliability Organization (Mason et al., 2014). Evidence from the literature supports improving the process for pre-operative scheduling by standardizing the pre-operative booking process.

Rationale

Conceptual Framework

From themes identified in the review of the evidence, appropriate conceptual and/or theoretical frameworks were selected to guide the project. Two theoretical frameworks were chosen, the Donabedian Medical Quality Improvement Theoretical Framework to improve patient and quality indicator outcomes and the Rogers Diffusion of Innovation Theory.

The Donabedian framework was introduced in 1966 by Avedis Donabedian, a doctor and health services researcher. He set out with a strong determination to apply unbiased scientific principles (i.e., "standards of quality") to patient care to improve outcomes (AHRQ, 2015; Berwick & Fox, 2015). The major concepts in the framework are *structural measures, process measures, and outcome measures* (AHRQ, 2015). Structural measures contain the components of evaluating health care, examining medical capabilities or methods, and implementing practices that ensure safe, excellent value healthcare exists. Process measures are indicative of what a healthcare worker may do to preserve or increase baseline healthy practices, for those not seeking healthcare but health, or those in need of interface with the medical community for evaluation or ongoing care, which will often include the utilization of established, evidence-based processes for care. Outcome measures indicate the overall effect and bearing the medical continuum has on patients (AHRQ, 2015). This theoretical framework has quite a substantiated history in its evolution and has been utilized successfully by healthcare organizations. Pre-operative booking has many moving parts and human factors intertwined within its system, thus evaluating the theoretical framework of the Donabedian model to improve patient and quality indicator outcomes while implementing the SS TST® is applicable. Structure asks if we are decreasing the possibility of harm in the healthcare setting.

Process is asking what the predictive value is of performing as we have been trained (with evidence-based practice). Outcome asks if our actions cause adverse outcomes and if so at what interval and with what regularity. Then, looking at the framework in total, the question asked is if a pre-operative booking process based upon evidence and High Reliability Organization (HRO) tenets, especially in checklists, has created a safer, higher quality care setting for patients. The Donabedian model aligns with the pre-operative booking defect quality improvement project which strives to increase patient safety and the quality of care by identifying entry points for errors in the preoperative booking process that can lead to WSS. In many cases, pre-operative booking is a non-standardized, inefficient, and error-prone process. Therefore, developing the structure needed to improve quality patient care by identifying and targeting the risks identified in pre-operative booking enabled streamlining the processes of surgical scheduling to facilitate safer patient outcomes.

The Rogers Diffusion of Innovation Theory (Rogers, 2003) was first introduced by E.M. Rogers in 1962 and has become one of the most well-accepted explanations of the continuum along which innovations are introduced and take hold. This theory is derived from the science of communicating, explaining how, over a period, innovation ignites and diffuses among a specific populace or formalized social structure. The five categories of “adopters" are 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards. Diffusion unravels itself in many ways and is extremely dependent on the types of individuals and innovation-decision processes utilized. The SS TST® used in this project is one tool that is dependent upon the dissemination of information. Any evaluation of the tool's success must include where stakeholders are on the “adopter” continuum. The stakeholder tool within the TST® has a scale built into an Excel spreadsheet that enables rating each stakeholder’s

current level of buy-in to change (on a scale of zero to 10). The SS TST® required the project manager to rate each stakeholder (see Appendix D stakeholder tool).

Section III: Methods

Context

The pre-operative surgical booking defect quality improvement project was implemented at a >300-bed acute care hospital in Texas. The sponsor of the project and a key stakeholder was the Chief Nursing Officer (CNO). Other key stakeholders for this project were the Director of Perioperative Services, the Lead Surgical Scheduler, the Chief of the Medical Staff, a service/product line physician champion (Orthopedics), the Director of Quality and Patient Safety, Director of Patient Care, a Patient/Customer Experience champion, a Clinical Informaticist, and the Surgical Liaison RN. Using the stakeholder analysis component of the SS TST®, the DNP project lead assessed 10 stakeholders and found eight were aware of the need for a process change and supportive of the proposed interventions.

Interventions

The quality improvement project was the implementation of the pre-operative booking component of the Safe Surgery Targeted Solutions Tool® (SS TST®) to reduce variability in surgical booking procedures, thus mitigating the risk of a wrong-site surgery or related "never" event within the perioperative continuum (e.g., wrong-site surgery.) The intervention took place in two settings: 1) a hospital scheduling office where booking forms and phone calls are received and surgical procedures are scheduled, and 2) the physicians' offices where the bookings and booking forms originate.

Safe Surgery Targeted Solutions Tool®

The Joint Commission Center for Transforming Healthcare (CTH) developed the Safe Surgery Targeted Solutions Tool® (SS TST®) to map individual risk factors for wrong-site surgeries to solutions that mitigate them. This tool was used to define and target specific risks in the pre-op booking process of the microsystem for this project. Using the tool's self-contained, data-driven process, specific defects are identified, targeted solutions are implemented, outcomes monitored, and sustainment strategies delivered. The SS TST® includes explanations of the surgical booking audit checklists and a video, along with a return-back demonstration within the tool. These components engaged the staff with the change management strategies CTH employs in Robust Process Improvement (RPI®). The SS TST® is predicated on the premise that the absence of a previous wrong-site surgery should not be taken as reassurance that it will not occur. Evaluation of process accuracy must occur to recognize where the risk lies.

The SS TST® has a "Toolkit" containing elements that follow the LSS define, measure, analyze, implement, and control (DMAIC) phases. Tab 1 is the "Define" Tab. The steps within Tab 2, the "Measure" Tab, are where the baseline data was gathered. Tab 3 is the "Analyze" tab. For the analysis phase of this project, proportion charts (p charts), Pareto charts, and analysis of means (ANOM) charts were produced to determine baseline defect rates (Appendix E). During this "Tab 3 phase," the DNP project lead reviewed baseline data with the stakeholders to share expertise on the two most prevalent defects identified. Those findings were: 1) Receipt of Form Defects (surgeons' offices not using any form, but rather calling surgical cases in to be booked) and 2) missing or incorrect information IF surgical booking forms were used (Appendix F). Following review and feedback from the stakeholders, the project lead mapped the targeted solutions indicated by the defects and initiated the improvements. Tab 4 provided guidance and

tools to “Implement” these solutions. The fifth tab is “Sustain the Gains,” which translates to the “Control” phase of the define, measure, analyze, improve, control (DMAIC) sequence of Lean Six Sigma.

Gap Analysis

The gap analysis included the steps of the quality improvement project, which also follow the DMAIC concept within Lean, Six Sigma. In the *Define* portion of the gap analysis, the current state was that the hospital perioperative staff were unaware that WSS risk events resided within their realm of practice (Appendix G). The desired state was to introduce the SS TST® Pre-op Booking Project to the hospital with the goal that WSS events would never occur, especially with surgical booking as a cause or contributing factor. Next, within the *Measure* portion of the gap analysis, an assessment of existing literature regarding pre-op scheduling processes took place, as there are not many studies to reference which have had successful measurable outcomes. Additionally, noted within the current state, the DNP project lead measured hospital baseline pre-op booking defects/risks for WSS from SS TST® entries, which required a minimum of 100 initial observations entered by physician ID/code and service. To reach the desired state, the determined risks were calculated and disseminated to stakeholders. Within the Analyze phase, the current state demonstrated no apparent standardized methods utilized to schedule surgical cases at the hospital. The desired state was to identify multiple entry points and methods to schedule surgeries at the hospital and determine those root causes that could have contributed to WSS within their perioperative arena. For the *Implement Solutions* current state, a change management strategy was implemented at the hospital. The desired state was continued implementation of the change strategy with targeted solutions throughout the hospital’s perioperative process. Lastly, within the *gap analysis's Control/Sustain Gains section, the*

current state recognized the hospital's perioperative leadership as unfamiliar with the SS TST® implementation guide. The desired state was consistent leadership facilitation of the implementation guide and sustainment of the gains (e.g., process standardization).

Gantt Chart

The initial Gantt chart established during the third semester of the DNP program was adjusted according to the time frame plausibility for the project lead and feedback from facility key stakeholders as well as leaders from the CTH. The QI project was initially projected to take 16 weeks. After consultation, the original timeline was adjusted to 32 weeks to accommodate the lack of consecutive weeks the project lead would be at the facility to perform the project, COVID-19, and unanticipated events within the hospital. The Gantt chart displays actual timeline adjustments, with key targets inclusive of prospectus, QI project text development, QI project presentation, and graduation. See Appendix H for the Gantt Chart.

Work Breakdown Structure

The project lead was responsible for providing SS TST® orientation, direction, and training on the tool related to the DMAIC principles and components built into the program. The project lead evaluated all baseline pre-op booking defects to determine which targeted solutions were required to mitigate those risks and evaluated post-intervention preoperative booking defects to calculate the proportion chart, the Pareto chart, and the analysis of means (ANOM). The Work Breakdown Structure (WBS) contributed to managing each deliverable for the project (Appendix I). The WBS provided a visual tool to implement each step of the project (Martinelli & Milosevic, 2016). The WBS outlined the achievement goal, project definition, and the steps that followed, including the stakeholder analysis and charter development. The baseline number and types of defects were determined, and the metrics were entered into the database to

determine the next step, analyzing defects. In the analysis phase, the methods used to schedule surgical cases were examined for root causes of defects. The most prevalent defects were mapped to solutions. In the *Implement Solutions* phase, the project lead implemented the solutions and shared best practices with the key stakeholders, with the intent to *Control/Sustain Gains*.

Responsibility/Communication Plan

The DNP project lead was solely responsible for project communication (Appendix J). The communication methods were virtual (via Zoom, Skype calls, phone calls), in person, and written communication (email and texts). Key communication points were the stakeholder kickoff meeting, the project charter development, the project status report, the project review, and a debrief of project results. The DNP project lead conferred weekly with the DNP project advisor and monthly with the hospital CNO, who facilitated communication at the corporate level to help move the project forward and sustain the results. The Chief of the Medical Staff was the project champion who communicated directly with the project surgeons. The Director of Quality and Patient Safety introduced key members of the hospital and corporate staff to the project lead to facilitate progress of the project. The Director of Perioperative Services, the Director of Patient Care, the Lead Surgical Scheduler, and the Surgical Liaison RN were instrumental in collecting and disseminating pre and post intervention statistics to all surgeons' offices involved.

SWOT Analysis

A SWOT analysis was conducted to understand issues with potential impact on the project. The organization's strengths were within the CNO and Director of Perioperative Services' supportive leadership and key stakeholder awareness of known risk for lack of a

standardized pre-op booking process (Appendix K). The organization is very performance-improvement-driven and a Magnet© Recognition Facility. An area of weakness was the project lead not knowing the CMO or any product line chiefs. The project lead did not have internal contacts with staff as an employee and thus originally lacked the ability to obtain information informally or make spur-of-the-moment observations.

Opportunities were determined to be the project leader's ability to leverage evidence-based quality improvement methods from other organizations (e.g., The Joint Commission and the Center for Transforming Healthcare). There was an opportunity for the project lead to publish aggregate findings from other organizations to add to the body of knowledge on mitigating risks from pre-operative booking defects. Other opportunities were being able to share best practices from external organizations. Threats included inadequate evidence in the literature on surgical booking as a contributing factor for WSS, and lack of awareness by hospital system leadership of pre-operative booking as a risk factor warranting attention, limiting the ability to scale the project. As there were multiple entry points (approximately 60 for this facility) and scheduling modalities for surgical scheduling, physician offices often had no direct affiliation with the location where surgery is performed, confusion and miscommunication did increase the risk of WSS.

Budget

The first component evaluated with the budget included the staff who were required to contribute time to the success of this project (Appendix L). This budget included the project lead obtaining baseline and post-intervention data and communicating project status for 40 hours per week for 2 weeks per month ($4,480/month x 10 months) for a total of $44,800. Three outside consultants provided consultation, these consisted of a Registered Nurse consultant with a phone

call 1 hour/month for 4 months = $224, and a Data Analyst consultant who performed data extraction for 1 hour/week for 10 months for 4 weeks per month (once a week) = $2400, and the other was a Director within the outside consultant group who provided project oversight 1 hour/week for 10 months x 4 weeks per month = $4800. The Perioperative Director met with the project lead 1 hour/ week for 10 months x 2 weeks per month = $2400. CNO guidance/support/Stakeholder update meeting 2 times/month for 10 months = x4 hours/month 2 x's/month = $4800. The Anesthesia Champion attended the stakeholder update meeting once a month x 10 months = $3650. The Chief of the Medical Staff met with the project lead 2 times/ month x 2 hours = $1471.80 to review progress and facilitate project continuation. The hospital surgical schedulers met with the project lead for 8 hours/month x 10 months = $1325.60, and the physician office surgical schedulers met 4 hours/month x 10 months = $662.80. This total cost for staff to implement the project totals $66,534.20. The second component was a corporate IT investment estimated at $67,520.00 within the initial year launch to update the surgical scheduling website, bringing the first-year total investment cost estimate to $134,064.20, with a three-year cost of implementation projection totaling $202,411.20.

In addition to the costs projected to implement the SS TST®, each WSS comes with the estimated average cost as greater than $179K per case (Mehtsun, 2013). With a consistent estimate of 40-50 WSSs within the United States every week, this totals over $465M in tangible costs per year (The Joint Commission, 2020).

Study of the Interventions

The rationale for choosing these interventions was the evidence-based efficacy of the SS TST®, its demonstrated validity, and its direct correlation decreasing risks of never events after implementation of the targeted solutions. The approach chosen to assess the impact of the interventions was gathering the post-intervention data to measure an anticipated decrease in defect rate. The data would also provide information on changes in surgical schedulers' satisfaction with preoperative booking post-intervention. The approach used to establish whether the observed outcomes were due to the interventions was using the built-in mechanism for calculations within the SS TST® and collecting responses from the surgical schedulers.

Outcome Measures

The outcome measures (number and types of pre-booking defects) were illustrated with proportion-charts (p charts), Pareto charts, and analysis of means (ANOM) diagrams (Appendix M). Rationale for expressing the outcomes this way was that these charts and diagrams are built into the SS TST® and show the change from baseline defects to post-intervention improvements as a quantitative indicator of mitigating WSS risk. These measures were created and validated by CTH to evaluate the effectiveness of implementing the targeted solutions, thus, no new measures needed to be developed or validated for this project. CTH has determined the accuracy of data for the project work to have a p-value of 0.000 of 0.000. A table showing the p-value calculation is presented as Appendix C.

Data Collection Instruments

The Center for Transforming Healthcare provided the data collection instruments where they have undergone validation from pilot facilities (Appendix N). These tools have had their reliability proven by measuring the process and outcomes over the past ten years with over 70 facilities throughout the US. The measures chosen were the product lines at this facility with the greatest number of cases with laterality: orthopedics and cardiovascular services. The operational definitions are provided within the Safe Surgery Data Collection training module, and the qualified data collectors then enter data into this worksheet based upon their observations. The requirement from the CTH is at least 100 observations over at least two weeks are obtained to gather baseline and post-intervention data. The DNP project lead created the data collection instrument to evaluate surgical schedulers under the guidance of the project committee chair. An analysis of quantitative and qualitative data obtained from the surgical scheduler staff related to staff satisfaction with their training and role satisfaction with the current processes and subsequent satisfaction with the changes to the workflow were measured.

Analysis

A mixed-methods study was performed. The quantitative testing measured the percentage of risk for never events. A quantitative and qualitative study was performed pre- and post-intervention to evaluate surgical scheduler satisfaction utilizing the SS TST®**.** The quantitative data analysis was performed using the Microsoft Excel Mini tab in the SS TST® to collate and extrapolate the data. Qualitative data was collected and analyzed to determine perceived risks, methods, and processes whereby the physician office scheduling staff viewed the importance of their role within the surgery scheduling process. See Appendix O for Surgical Scheduler Pre and

Post Intervention Data and Appendix P for Surgical Scheduler Quality Improvement Questionnaire.

Ethical Considerations

An initial review by the project lead and project sponsor did not reveal any ethical considerations that indicated the need for a formal ethics review. No conflicts of interest were identified. Data collected was masked (using patient codes and a numeric coding system for both the hospital and pilot physicians alike) and aggregated to avoid any breach of confidentiality, standard practice embedded in the SS TST®. All data shared externally is anonymous and shared with the explicit permission of the hospital. The data used in this study is aggregated and de-identified; no representation can be made to the type of facility where defects were identified. Hospital staff (the three in-house schedulers and the Administrative Assistant to the Director of Perioperative Services) who entered data or comments have their anonymity protected through masking codes. The DNP project lead has an Affiliation Agreement with both the hospital and the Joint Commission Center for Transforming Healthcare (Appendix Q).

Another component within ethical consideration includes beneficence. Beneficence is defined within Grace's text, this is a component of ethics, which urges those employed within the healthcare setting, to continue towards goals that were originally set forth to provide a service that ensures the patients' greatest interests (2018). By measuring and identifying the greatest risks for wrong-site surgeries, evaluating the methods employed from surgeons' offices to the hospital, the facility targeted the two highest risk categories at the entry point for surgery scheduling. This ethical principle was met because it is certainly within the best interest of the patients to alleviate any known, preventable risk to avoid the potential for a

wrong-site, wrong-side, wrong-approach, wrong-procedure event (also known as “never events”).

Autonomy is the ethical principle to ensure a patient’s authority to be cared for in a dignified and respectful manner (Grace, 2018). An effort whereby respecting all patients regarding their treatment includes their inherent trust in the healthcare professionals to reduce or eliminate anything known to be a risk. Implementing the safe surgery scheduling tool was a pointed example of how patients’ dignity and respect increased as their risk was decreased.

The ethical principle known as veracity entails availing the truth to patients and allowing them transparent information regarding their health and care requirements (Grace, 2018). This principle enabled the autonomy and propagated patients being able to make informed decisions. Over the past year, patients have given pointed feedback on their post-operative surveys. Because the pre-operative process has been very disjointed, they have questioned faith in the pre-operative process. It added to their being more apprehensive on their day of surgery. This apprehension was a driving force in the Customer Satisfaction revamping of this pre-op process to make it more streamlined, standardized, and safer. Giving these patients this transparency that a performance improvement process has been put into place emphasizes veracity with this population.

The concept of restorative or compensatory justice involves reinstating that entity to people which they may have lost due to the actions or inactions of others (Grace, 2018). This principle can be applied both to patients and staff members alike. This project targeted the patients, to reinstate trust and satisfaction with this facility, which was diminished due to the fractured management of this process. The physician office and hospital surgical scheduling staff had decreased faith in the system, as they have tried to implement online scheduling to be

the norm versus telephonic scheduling, to decrease risk and disparate verbal surgical bookings actual orders received within the Pre-Admit Clinic. The tenet of "justice as fairness," was inclusive as this project ensured fairness and equitability were ingrained across this continuum of decreasing risk of never events.

This project sought to ensure psychological safety also for the patients and staff members. "Psychological safety is the shared belief that the team is safe for interpersonal risk-taking. Its presence improves innovation and error prevention" (Grailey, et al., 2021). The patients require psychological safety as they undergo surgery, giving their lives totally and completely to the anesthesia and surgical staff. This project supports psychological safety by providing staff and patients the knowledge and confidence risks for WSS have been thoroughly evaluated, measured, and mitigated by utilization of this methodology.

There are six values known as the principles of the Jesuits (Creighton University, n.d.). First, may we advocate for our patients, may it be "Ad Majorem Dei Gloriam for the Greater Glory of God." The SS TST® is allowing pre-operative booking staff, by reducing risk, to be bold patient advocates. As Florence Nightingale wrote in her diary, "Let me only accomplish the Will of God," as we care for patients who are the center core of this project, may we only strive to do what we do, for our patients *and* our fellow healthcare providers "For the greater glory of God," and not ourselves (Wellman, 1999). Another Jesuit principle is, "Forming and Educating Agents of Change: Teaching behaviors that reflect critical thought and responsible action on moral and ethical issues." This principle drives what we do as healthcare educators, and as this DNP project lead has educated surgical booking staff as to what an important job they hold in minimizing or eliminating risk for WSS. An effort to help shape our current and future healthcare professionals by educating them to become, "Agents of Change" especially within

today's world where moral and ethical matters (e.g., to keep our patients free from wrong-site surgeries) are more pertinent to address than ever before in the history of our lives.

The ANA Ethical Standards has nine provisions, of which several were relevant to this project. Provision 1 is, "Respect for Others" with these items listed within the subsets.1.1 The Respect for Human Dignity,1.2 Relationships with Patients,1.3 The Nature of Health,1.4 The Right to Self-Determination, and 1.5 Relationships with Colleagues and Others. Respect for others is undoubtedly number one on ANA's list of ethical standards. Healthcare professionals must first and foremost respect others in every situation, if even respectfully disagreeing, and advocate for patients, families, and staff members. Focusing on provision 1.5 allows for all we meet, we must respect, especially regarding relationships with colleagues, advocating for patient safety and striving to alleviate any deviation or potential for WSS. The second Provision is: "Commitment to the Patient," with these items listed as subsets: 2.1 Primacy of the Patient's Interests, 2.2 Conflict of Interest for Nurses, 2.3 Collaboration, and 2.4 Professional Boundaries. Commitment to the patient is a primary focus within the project and ensures the highest quality, most informed, and safe care possible. This commitment comes in education to the patient care teams including surgical schedulers and all within the perioperative continuum. Allocating resources and educational training modules is an aspect of commitment to the patient, considering WSS prevention. The third Provision is: "Advocacy for the Patient." 3.1.4 Professional Responsibility in Promoting a Culture of Safety, demonstrated by advocating for patients is an ethical provision whereby nurses must act in support of patients, by utilizing evidence-based practice for surgical scheduling for potentially vulnerable patients.

Section IV: Results

The needs identified for this intervention, which were determined from the gap analysis, came first from the lack of identification and evaluation of inherent risk for WSS with targeted solutions (Appendix R), and second from the risk of lack standardization of the surgical booking process with a targeted solution. An additional gap was identified three months into this project as an informatics lack of agility. Most office surgical schedulers were not granted access to a surgical procedure request via the preferred online method. Additionally, the project lead collected qualitative data on the level of training and satisfaction of surgical schedulers with the pre-intervention process. Levels of training and satisfaction were measured again post-intervention to ascertain changes in schedulers' perspectives towards their positions and the scheduling process at large.

The process measure findings for the SS TST® were gathered from the baseline data. Targeted solutions were then put into place for the two identified greatest risks for this facility. The baseline data for 100 scheduled surgical cases revealed 70% of surgeries were scheduled over the phone (see Appendix E). The SS TST® showed that the greatest measured risks were: 1) the risk of verbal/telephonic surgical scheduling, and 2) lack of or misinformation and no written changes when made to the surgery schedule. These highlighted the targeted solutions put into place. The initial findings from the six surgery schedulers revealed three had over three years in their positions and three respondents had less than three years performing surgical scheduling. Experienced schedulers had higher job satisfaction levels than those with fewer years' experience (Appendix P).

The SS TST® timeline for the initial steps was adjusted as described in the Gantt Chart narrative and may be visualized within the SS TST® Project Timeline Diagram (Appendix G).

The project lead was able to meet with one of the surgical schedulers, the Surgery Liaison RN, the Director of Quality and Patient Safety, and the Performance Improvement Director in January 2021 to conduct a project mapping session as a starting point (Appendix S). The Pre-Admit Clinic (PAC) performed chart reviews prior to surgery and identified incorrect booking (CPT) codes which translated as errors (defects/risks) from scheduling to the patient going to Pre-Op. There was no way to verify a verbal booking. The project lead also completed the SS TST® Charter evaluation tool in January 2021.

The initial steps of the interventions from each of these findings were to go to the providers' offices in April 2021 to share the findings (Appendix T), share the risk, and request their participation in the pilot study to afford them the ability to participate in this project. All office surgical schedulers agreed to join the pilot project at this time, understanding the WSS risk, but only one office began utilizing the form. During the in-person visit in April, the DNP project lead disseminated the anonymous questionnaires to the surgical schedulers to determine baseline qualitative data (refer to Appendix O). To ensure anonymity the project lead had the schedulers mail their documents. Six of the eight schedulers returned the questionnaire (75% response rate), which was valuable in making recommendations to the Corporate Patient Experience Team and the Corporate IT/ISD Team with which the project lead was working. The initial findings also revealed scheduler overall satisfaction with online written versus verbal booking of surgical cases. Three of the five (60% response rate) post-intervention questionnaires distributed were returned (of note three of the original office schedulers vacated their positions during the project timeline). The SS TST® post-intervention surgical scheduler findings showed the surgical scheduler levels of experience were evenly distributed. The common post-intervention findings revealed the schedulers preferred the online/written method of surgical booking to alleviate

errors and disparities between those phoned in versus booked electronically. Unanimously (100%) of the schedulers recognized the benefits of booking electronically versus over the telephone. These findings also solidified the premise predicated by the SS TST®. The corporate IT Team is still currently working to streamline this process to support both the office and in-hospital schedulers due to the findings discovered during this project. The SS TST® post-intervention data reviewed 148 scheduled surgical cases, which decreased from an 88% error rate to a 41% error rate for surgical cases which were scheduled verbally. The overall results show a relative improvement of 53.4% over a three-month period.

Modifications had to be made to the project. Most changes were made due to unanticipated events (internal, weather, COVID-19) and poor utilization of the form. Multiple challenges were ensuring all the pilot offices would use the SS TST® scheduling form. The impact of COVID-19 on surgical scheduling had an outsized effect on the project throughout the implementation phase. A surge of COVID patients impacted the entire operations of the project facility from July through October 2021. All non-emergent surgeries were canceled, and no new surgeries could be booked. The recovery room was converted to a COVID unit. The operating room nurses were being utilized elsewhere in the hospital, again requiring a timeline and project plan modification.

Contextual elements that interacted with the interventions and could account for the outcomes/delays in progress for this project had an unequivocal underpinning of the effects of COVID on the medical communities at large. The project lead found literature that shared the same phenomenon worldwide due to the pandemic. Surgeries were cancelled and prioritization of cases (oncology patients for example) which were allowed to be scheduled (only on a case-by-case basis) were defined and authorized in a parallel manner which is described by Soreide, et al (2020). Soreide discussed the undiscovered fallout and succession of outcomes that cannot be

measured yet, due to the delay in surgeries for so many patients. The model, “Pandemic burden and impact on surgical services,” (Appendix V) found within Soreide’s article highlight the cascade of events which would be perpetuated by continued delay or cancelation of surgical procedures for those requiring surgical interventions (Soreide, et al., 2020).

There were several observed associations between outcomes, interventions, and contextual elements, the greatest of which was inconsistent continuity in project progression due to the lack of the project lead being on-site continuously during the project; this was not favorable for project forward movement. The project lead did not have direct authority with any of the staff members responsible for the project's success. The project lead was reliant upon others, and as such the project lead realized the project was likely not as successful, progress did not occur as rapidly as possible. Contextual elements played a large part in this project.

Another phenomenon which added to the outcome timeline and the interventions, was that the project lead discovered that Rogers' theory of Diffusion was a key player in getting buy-in and acceptance of the change required from the office schedulers. The project lead realized the importance of following the SS TST® recommendations from the targeted solutions. Those recommendations required a mandate of intervention implementation within one month of obtaining baseline data. The DNP project lead realized the necessity of being more vigilant in implementing that portion of the timeline would have avoided the prolonged implementation phase of this project. The project lead realized that the SS TST® was the project lead’s innovation and vision, yet that did not make this everyone else’s project.

Eight months into the project, the project lead was made aware of multiple emails sent back and forth among the pre-admit clinic nurses and the hospital surgical schedulers. These emails revealed the discrepancies between the phoned-in surgeries scheduled and what was

documented on the surgical consent and orders obtained in the PAC. Identifying these discrepancies was an eye-opening event for both the DNP project lead and the Risk Management Director when these were quantified (over 70 within 3 months). Another lesson learned through this process was that the surgical schedulers realized "surgical set cards" are a "guess" because there are numerous options to pull from and no direction from the surgeons' schedulers when scheduling surgery. This lack of direction can and has caused the incorrect surgical sets to be pulled for cases if not scrutinized and caught by the perioperative nursing team during surgical schedule review "huddle" the business day prior to the surgeries.

The unintended consequences, including the benefits, problems, failures, or costs associated with the interventions, and how these were mitigated, were widespread. The benefits, which were not something the project lead envisioned being a by-product, were that the Pre-Admit Clinic, by joining forces with this project, was able to increase procurement of orders for patients arriving for their Pre-Admit appointments. There was a noted improvement of approximately 95%, according to the Surgical Liaison RN, from the pilot offices the project lead interfaced with, who were unaware of the impact of not sending orders promptly, and this was a tremendous, unexpected win. The problems, as discussed prior, were the lack of ability of the DNP project lead to have continuous effort to move the project forward, sometimes with greater than a month with no interaction with the pilot offices. The project could and likely would have been successful far earlier if the project lead was onsite every day for the SS TST® 16-week timeline. This schedule was adjusted to meet the realistic timeline in which the project lead could be on site. The failures discovered also tied in with the lack of onsite continuity and a personal understanding of the facility's process flow, the key players involved, and the best mechanism to aid the office schedulers with a user-friendly pilot form. The form given to the office schedulers

was a Microsoft Word® document with shifting fields to be populated. As such, it drove some schedulers to hand-write in their surgical scheduling information. The mitigation for this was to work with the hospital clinical informaticist to produce a populatable form, or perhaps drive the actual update of the scheduling link to move faster than planned, as IT saw this as a stumbling block well.

The initial improvement plan evolved. The project lead presented to the hospital leadership in May 2021 and shared that the implementation phase of the new form would be captured during that month, with post-intervention feedback being captured, collated, and calculated within the month of June 2021. The project lead planned a follow-up presentation of post-intervention findings to the leadership team again in July 2021, which was delayed due to the abovementioned situations. Thus, alternative change strategies were considered and rejected, pushing the implementation phase into July with those reasons mentioned above. This evolution occurred because of lack of compliance and the project lead was solely responsible (with the guidance of the Chief of the Medical Staff) for this change of plans.

The noted effects the changes and improvements had on clinical and organizational outcomes and processes included discovering lack of preoperative booking standardization throughout the corporate entity. The Corporate IT office realized there was a process developed and shared throughout the corporation to improve how the office surgical schedulers entered their surgical requests. Still, this process was not being utilized uniformly. For example, the hospital where the project lead was implementing the project, started with a 70% *verbal* scheduling measurement. When the project lead shared this metric with a corporate clinical informaticist, it was realized that the central corporate hospital location had an average 90% *online* scheduling process which was presumed, in error, to be the norm throughout the corporate

facilities. This concern was ultimately shared with the hospital where the project lead was inculcated. The modality which was used at the central corporate hospital was implemented with a 53.4% relative improvement demonstrated at the SS TST® project site. The professional outcomes and processes were considered a win across the corporate enterprise as the leadership saw the initial data and supported the change, which was implemented, for a marked decrease in risk for Wrong-Site Surgeries among their facilities.

Section V: Discussion

Summary

This project demonstrated the tireless efforts that must go into change management, even when the risks are clearly identified. It is the opinion of the DNP project lead that the SS TST® is a tool that could not succeed without a committed team of leadership and implementation advocates. Despite meeting many obstacles, the executive team never took focus off the identified risk. Using the Facilitating Change® Model, this team was able to drive change by becoming aware of and alleviating factors contributing to risk.

Interpretation

The nature of associations between the interventions and the outcomes revealed a direct correlation between decreasing risk of WSS and preventing never events. The impact of the project on people and systems was more efficient communications. The Chief of Medical Staff has defined this as a target during the two-year tenure in this position to streamline the entire perioperative continuum, focusing on the preoperative booking as a first step to improve and accomplish this goal. The Director of Quality and Patient Safety stated this project has unearthed many hidden risks and made such a difference in how the facility views the perioperative process, and views this as a breakthrough in how the facility will handle preoperative booking in the future.

There were multiple reasons for differences between observed and anticipated outcomes directly due to context. The strongest reason identified throughout the entire implementation and closure of this project was the unanticipated lack of compliance with the pilot offices' request and the need to have an authoritative mandate to require these offices to comply. The project lead anticipated a much more robust desire to comply than was discovered. The pandemic's

impact on all healthcare workers included vast numbers of cancellations and rescheduling of cases for surgical patients. The costs and strategic trade-offs included the project lead engaging with the non-compliant offices three times to ask them to comply. The opportunity costs were the time and effort involved with the quantified cost avoidance from a WSS. The implications of these findings for the leadership of change decrease the risk for a never event. The facility will need to assign staff to sustain these gains after the project lead completes this initial project. Assumptions were made that all staff would see the risk and want to comply, this did not end up uniformly being the case.

The findings supported the Donabedian Medical Quality Improvement Theoretical Framework and Rogers Theory of Diffusion beyond the project lead's expectations. One of the five office schedulers was an "innovator," who used the new form immediately, gave constant feedback on how the form could be better laid out, and information which could be added. This scheduler was motivated by the possibility of change and wanted to reduce the risk of medical errors. Two of the five office schedulers were the "late majority." They did not schedule enough cases at this facility to grasp the concept of how much they played a part in accepted risk for WSS. The project director communicated with them during the implementation, and after approximately three months, they saw the benefit and began scheduling online on the approved form. The last two schedulers, who booked the most surgeries, were "laggards." They did not want to participate, their employers supported continuation of verbal scheduling, and they preferred to call rather than book online. The pilot form given to these five schedulers was not in an optimal format for use. One of the two "laggards" filled out the form twice and reverted to calling, and the other scheduler refused completely to book online until it was mandated by office leadership. Consistent with the premise of Roger's Theory of Diffusion, it was necessary

to take different approaches and provide different explanations of why schedulers should not be booking via telephone to move towards adoption.

The inferences from this work regarding means necessary to sustain the spread of the new levels of performance are pointedly described with the leadership requirement above, to appoint a staff member as the maintaining force to ensure all physician offices eventually adopt and comply with online booking versus verbal booking. The DNP project lead is hopeful this improvement will be spread to other facilities within the corporate entity. The implications of this work for future professional staff development entail assigning a ‘point person’ to monitor and sustain the gains and potentially assign a member within the Pre-Operative department at the hospital to continue this initiative and ultimately roll out the other three components within the SS TST®, completing the full purpose for which the SS TST® was created.

Limitations

The most notable limitation was a lack of buy-in from two physicians' offices to implement the targeted solutions. Data were gathered pre-and post-implementation and schedulers in the physician offices were encouraged to implement the targeted solutions, but it was at their discretion. A change in the overall makeup of surgical cases affected the types of booking defects identified and limited the generalizability of the results. The COVID-19 pandemic imposed a third limitation with multiple surges, which resulted in the cancellation of elective surgeries, a great proportion of which were orthopedic. Internet and email limitations at specific providers offices reduced their surgical scheduling staff's ability to comply with the requested pilot utilization of the on-line surgical scheduling form. The bias this creates from being unable to access the internet or the approved online form skews the data due to these offices lacking technological resources to perform their jobs.

Conclusions

The purpose of the project was to standardize preoperative booking processes to decrease the risk for never events. The project demonstrated utilization of the SS TST® improved standardization and decreased risks for wrong-site surgeries. The results were consistent with evidence from the literature, and expectations from the project lead, which predicted a marked reduction in risk from standardizing the preoperative booking process. The short-term implications of this project were the introduction of a practical way for both in-hospital and surgeon office schedulers to decrease risks of wrong-site surgeries. This risk was remedied by implementing a surgical booking form, including all required patient information and complete surgical scheduling components needed for the operative team executing the surgical procedures within the OR. Few studies have examined the impact of standardizing preoperative booking

processes on decreasing this WSS risk, providing an opportunity for future research to close this gap. Integrating a standardized preoperative booking process into “standard work” is necessary to sustain the process improvement demonstrated by the DNP project.

Section VI: Funding

The project did not receive any formalized funding. The project lead volunteered personal time and efforts for this project. The hospital funded the project with time and staff members required to support the necessary efforts to complete this risk evaluation. The outside consultant leaders and the support provided by the stakeholders was part of their salaried positions. The opportunity exists for future grant funding or salaried positions to assist with continuing this evaluation to reduce identified risks for a continued Safe Surgery program enterprise wide.

Section VII: References

Agency for Healthcare Research and Quality. (2015). *Types of healthcare quality measures*. https://www.ahrq.gov/talkingquality/measures/types.html

American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*. Author.

American Nurses Association. (2015). *Code of ethics for nurses with interpretive statements*. Retrieved September 25, 2020, from https://www.nursingworld.org/coe-view-only

Antony, J., Snee, R., & Hoerl, R. (2017). Lean Six Sigma: Yesterday, today, and tomorrow. *International Journal of Quality & Reliability Management, 34*(7), 1073-1093. doi: 10.1108/IJQRM-03-2016-0035

Bahensky, J. A., Roe, J., & Bolton, R. (2005). Lean Six Sigma: Will it work for healthcare? *Journal of Healthcare Information Management. 19*(1), 39. https://www.ncbi.nlm.nih.gov/pubmed/15682675

Berwick, D., & Fox, D.M. (2016). Evaluating the quality of medical care: Donabedian's classic article 50 years later. *The Milbank Quarterly, 94*(2), 237-241. 10.1111/1468-0009.12189

Brown, B., Riippa, M., & Shaneberger, K. (2001). Promoting patient safety through preoperative patient verification. *AORN Journal, 74*(5), 690,696-694,698. doi: 10.1016/S0001-2092(06)61768-7

Chassin, M.R. (2018). *Zero harm: An achievable goal*. Health Administration Press.

Chassin, M. R., & Loeb, J. M. (2013). High-reliability health care: Getting there from here. *The Milbank Quarterly, 91*(3), 459-490. doi: 10.1111/1468-0009.12023

Chassin, M. R., Mayer, C., & Nether, K. (2015). Improving hand hygiene at eight hospitals in the United States by targeting specific causes of noncompliance. *The Joint Commission Journal on Quality and Patient Safety, 41*(1), 4-12. doi: 10.1016/S1553-7250(15)41002-5

Clancy, C. M. (2007). TeamSTEPPS^{TM}: optimizing teamwork in the perioperative setting. *AORN Journal, 86*(1), 18. doi: 10.1016/j.aorn.2007.06.008

Clarke, J. R. (2014). Is your office helping you prevent wrong-site surgery? *Bulletin of the American College of Surgeons, 99*(4), 28. https://www.ncbi.nlm.nih.gov/pubmed/24783704

Clay-Williams, R., & Colligan, L. (2015). Back to basics: checklists in aviation and healthcare. *BMJ Quality & Safety, 24*(7), 428-431. 10.1136/bmjqs-2015-003957

Conley, D. M., Singer, Sara, J., Edmondson, L., Berry, B.A., William R., & Gawande, A.A. (2011). Effective surgical safety checklist implementation. *Journal of the American College of Surgeons, 212*(5), 873-879. doi: 10.1016/j.jamcollsurg.2011.01.052

Creighton University. (n.d.). *Leader tips: Jesuit values* [PDF file]. https://www.creighton.edu/fileadmin/user/StudentServices/SLIC/LEAD_Center/Jesuit_Values_PDF.pdf

Dang, D., & Dearholt, S. L. (2018). *Johns Hopkins nursing evidence-based practice* (3rd ed.) Sigma Theta Tau International.

de Vries, E. N., Prins, H. A., Crolla, R. M. P. H., den Outer, A. J., van Andel, G., van Helden, S. H., Schlack, W. S., van Putten, M. A., Gouma, D. J., Dijkgraaf, M. G. W., Smorenburg, S. M., & Boermeester, M. A. (2010). Effect of a comprehensive surgical safety system on patient outcomes. *The New England Journal of Medicine, 363*(20), 1928-1937. doi: 10.1056/nejmsa0911535

Early, G. (2010). Patient Safety: A tool from Atuls. *Journal of the Missouri State Medical Association.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6188412/

Eltorai, A. S. (2018). Lessons from the sky: an aviation-based framework for maximizing the delivery of quality anesthetic care. *Journal of Anesthesia, 32*(2), 263-268. 10.1007/s00540-018-2467-y

Gawande, A. (2010). *The checklist manifesto*. Henry Holt and Company.

George, M. L. (2002). *Lean Six Sigma*. McGraw-Hill.

Geraghty, A., Ferguson, L., McIlhenny, C., & Bowie, P. (2020). Incidence of wrong-site surgery list errors for a 2-year period in a single National Health Service Board. *Journal of Patient Safety, 16*(1), 79-83. doi: 10.1097/PTS.0000000000000426

Grace, P. (2018). Nursing ethics and professional responsibility in advanced practice (3rd ed.). Jones & Bartlett Learning, LLC.

Grailey, K., Murray, E., Reader, T., & Brett, S. (2021). The presence and potential impact of psychological safety in the healthcare setting: An evidence synthesis. http://hdl.handle.net/10044/1/90583

Joint Commission Center for Transforming Healthcare. (n.d.) *Facilitating change.* https://www.centerfortransforminghealthcare.org/who-we-are/facilitating-change/

Joint Commission Center for Transforming Healthcare. (n.d.) *Safe Surgery*. https://www.centerfortransforminghealthcare.org/improvement-topics/safe-surgery/

Joint Commission. (2015). Human factors analysis in patient safety systems [PDF File]. *The Source, 13*(4),1-10. https://www.jointcommission.org/-/media/deprecated-unorganized/imported-assets/tjc/system-

folders/assetmanager/humanfactorsthe_sourcepdf.pdf?db=web&hash=085A09275C38FACB50BC3D92CB35450A

Joint Commission. (2020). *Sentinel event statistics released for 2019.* https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/joint-commission-online/april-1-2020/sentinel-event-statistics-released-for-2019/

Kemper, P. F., van Dyck, C., Wagner, C., Wouda, L., & de Bruijne, M. (2014). Barriers and facilitators for taking action after classroom-based crew resource management training at three ICUs. *The Joint Commission Journal on Quality and Patient Safety, 40*(7), 311-318. doi: 10.1016/S1553-7250(14)40041-2

Kohn, L. T., Corrigan, J., & Donaldson, M. S. (Eds.). (2000). *To err is human: building a safer health system*. National Academy Press. doi: 10.17226/9728

Martinelli, R. J., & Milosevic, D. Z. (2016). *Project management toolbox* (2nd ed.). Wiley & Sons.

Mason, S. E., Nicolay, C. R., & Darzi, A. (2014). The use of Lean and Six Sigma methodologies in surgery: A systematic review. *The Surgeon,13*(2), 91-100. 10.1016/j.surge.2014.08.002

McCarron, K. (2011). Understanding care bundles. *Nursing Made Incredibly Easy, 9*(2), 30-33. 10.1097/01.NME.0000394024.85792.42

Mehtsun, W. T., Ibrahim, A. M., & Diener-West, M. (2013). Surgical never events in the United States. *Journal of Vascular Surgery, 58*(1), 277. doi: 10.1016/j.jvs.2013.05.040

Melnyk, B. M., & Fineout-Overholt, E. (2015). *Evidence-based practice in nursing and healthcare* (3rd ed.) Wolters Kluwer/Lippincott Williams & Wilkins.

Michaels, R. K., Makary, M. A., Dahab, Y., Frassica, F. J., Heitmiller, E., Rowen, L. C., Crotreau, R., Brem, H., & Pronovost, P. J. (2007). Achieving the National Quality Forum's "never events": Prevention of wrong site, wrong procedure, and wrong patient operations. *Annals of Surgery, 245*(4), 526-532. doi: 10.1097/01.sla.0000251573.52463.d2

Moore, L., Lavoie, A., Bourgeois, G., & Lapointe, J. (2015). Donabedian's structure-process-outcome quality of care model: Validation in an integrated trauma system. *The Journal of Trauma and Acute Care Surgery, 78*(6), 1168-1175. doi: 10.1097/TA.0000000000000663

Ogrinc, G., Davies, L., Goodman, D., Batalden, P., Davidoff, F., & Stevens, D. (2016). SQUIRE 2.0 (Standards for Quality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. *BMJ Quality & Safety*, *25*(12), 986-992. doi: 10.1136/bmjqs-2015-004411

Paull, D. E., Mazzia, L. M., Neily, J., Mills, P. D., Turner, J. R., Gunnar, W., & Hemphill, R. (2015). Errors upstream and downstream to the Universal Protocol associated with wrong surgery events in the Veterans Health Administration. *American Journal of Surgery, 210*(1), 6-13. doi: 10.1016/j.amjsurg.2014.10.030

Proudlove, N., Moxham, C., & Boaden, R. (2008). Lessons for Lean in healthcare from using Six Sigma in the NHS. *Public Money & Management, 28*(1), 27-34. doi: 10.1111/j.1467-9302.2008. 00615.x

Reason, J. (1990). *Human error*. Cambridge University Press.

Reason, J. (2000). Human error: models and management. *BMJ*, *320*(7237), 768-770. doi: 10.1136/bmj.320.7237.768

Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). Simon & Schuster.

Sales, A., Smith, J., Curran, G., & Kochevar, L. (2006). Models, strategies, and tools. Theory in implementing evidence-based findings into health care practice. *Journal of General Internal Medicine, 21 Suppl 2*(S2), S43-S49. doi: 10.1111/j.1525-1497.2006. 00362.x

Savage, C., Gaffney, F. A., Hussain-Alkhateeb, L., Olsson Ackheim, P., Henricson, G., Antoniadou, I., Hedsköld, M., & Pukk Härenstam, K. (2017a). Safer paediatric surgical teams: A 5-year evaluation of crew resource management implementation and outcomes. *International Journal for Quality in Health Care, 29*(6), 853-860. doi: 10.1093/intqhc/mzx113

Søreide, K., Hallet, J., Matthews, J. B., Schnitzbauer, A. A., Line, P. D., Lai, P. B. S., Otero, J., Callegaro, D., Warner, S. G., Baxter, N. N., Teh, C. S. C., Ng-Kamstra, J., Meara, J. G., Hagander, L., & Lorenzon, L. (2020). Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *British Journal of Surgery, 107*(10), 1250-1261. doi: 10.1002/bjs.11670

Spruce, L. (2014). Back to basics: Implementing the surgical checklist. *AORN Journal, 100*(5), 465-476. doi: 10.1016/j.aorn.2014.06.020

Treadwell, J. R., Lucas, S., & Tsou, A. Y. (2014). Surgical checklists: a systematic review of impacts and implementation. *BMJ Quality & Safety, 23*(4), 299-318. doi: 10.1136/bmjqs-2012-001797

van Klei, W. A., Hoff, R. G., van Aarnhem, E. E., Simmermacher, R. K., Regli, L. P., Kappen, T. H., van Wolfswinkel, L., Kalkman, C. J., Buhre, W. F., & Peelen, L. M. (2012). Effects of the introduction of the WHO Surgical Safety Checklist on in-hospital

mortality: A cohort study. *Annals of Surgery, 255*(1), 44-49. doi: 10.1097/SLA.0b013e31823779ae

Weld, L. R., Stringer, M. T., Ebertowski, J. S., Baumgartner, T. S., Kasprenski, M. C., Kelley, J. C., Cho, D. S., Tieva, E. A., & Novak, T. E. (2016). TeamSTEPPS™ improves operating room efficiency and patient safety. *American Journal of Medical Quality, 31*(5), 408-414. doi: 10.1177/1062860615583671

World Health Organization (2009). *The WHO Guidelines to Safe Surgery* [PDF File]. https://apps.who.int/iris/bitstream/handle/10665/44185/9789241598552_eng.pdf?sequence=1

Womack, J. P., & Jones, D. T. (1997). Lean thinking: Banish waste and create wealth in your corporation. *Journal of the Operational Research Society, 48*(11), 1148. doi: 10.1057/palgrave.jors.2600967

Wu, R. L., B.S, & Aufses, A.H., M.D. (2012). Characteristics and costs of surgical scheduling errors. *American Journal of Surgery, 204*(4), 468-473. doi: 10.1016/j.amjsurg.2012.01.011

Section VIII: Appendices
Appendix A

Integrated Review of Literature

Article Number/Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1. Brown, et al. (2001)	Mixed Quantitative and Qualitative	-30-day retrospective eval of surgical schedule compared to published surgical schedule - a process to verify patient identification, procedure, and procedure side and site was developed and implemented to improve the current process	-2 areas of weakness ID'd in surgical schedule: --scheduling forms --scheduled procedures -40% discrepancy there was found to be regarding information *from* Dr. office - The improved process maximizes	-Quality indicators -Risks ID'd - Discrepancies by # -# Staff trained -Decreased risk of sentinel events -Improved Quality of Care -Task force members identified seven areas of potential risk related to accuracy:	-Rapid timeline for data entry --rough data was received early within the study, but a complete analysis was able to be completed within 2 months	Level III, A-High Quality

		- Focusing on risk-reduction strategies, interdisciplinary task force revised the facilities' surgical site identification policy and improved the surgical scheduling form to highlight information for sided procedures - Task force members also designed a verification checklist to require the comparison of any procedure data to the physician's order -Spectrum Health System,	patient safety because it allows for early intervention when any discrepancies are identified	1. surgery schedule 2. documentation received from physicians' offices 3. preoperative documentation 4. preoperative checklist 5. surgeon interaction with patients immediately before surgery 6. surgical record 7. identification and verification of scheduled procedure and procedure site		

		Grand Rapids Michigan				
2. Wu, et al. (2012)	Quantitative	-17K surgical procedures eval'd for surgical scheduling errors -Mt Sinai Med Ctr, NY	-151 (0.86% of the 17K) were booking errors *Most common: --wrong side (55) =36% --incomplete (38) =25% --wrong approach (i.e., laparoscopic vs. open surgical procedure) (25) =17%	-# forms Incomplete -# booked wrong approach -delays average 20 minutes = $320 (avg $16/minute for OR time)	-not much research done in this area -more research is needed to develop tools to more accurately schedule	Level II, A-High Quality
3. Clarke, et al. (2014)	Quantitative	Pennsylvania (PA) Patient Safety Authority (PSA) -Now at 76 facilities in PA, ORs and Ambulatory Surgery Centers (ASCs) who have	-PA PSA estimates 1/63,603 procedures result in WSPs -Noted 45% decrease in WSPs from Jul '07- Jun '08 from the start of the wrong site	-541 wrong-site procedures (WSPs) and of those 59 pts (11%) led to wrong-site surgery (WSS) --34 (58%-wrong side)	-Likelihood of WSS is low	Level I, A-High Quality

		implemented best practices for prevention of WSS -Jul ’04- Jun ‘13	surgery prevention program/checklist -Collaborative efforts (surgeons, anesthesia, and perioperative staff) -Prevented misinformation from entering the OR -Avoided misperceptions in OR suite -Collaborative team came together to develop PI process -Estimated average claim for WSS $158,560	--2 (3%- wrong spinal level) --8 (14% wrong location i.e., wrong finger) --15 of 59 (25% wrong procedure, this was noted to be significantly higher than the 8% registry as a whole with a p value <.001 by the chi-square test) -Facility measured the incomplete information *from* the doctors’ offices --34= 1 wrong type of information --23= 2 types of wrong information		

				--2= 3 types of wrong information ---11 types of misinformation		
4. Spruce, Lisa. (2014)	Non-research evaluation appraisal	-13 articles compared/contrasted findings from utilization of perioperative checklists	-Multiple articles cited that: --A checklist is a tool, and safety depends upon a *team interest AND team communication* --A key component for successful checklist implementation is to *explain* and *adequately demonstrate* the use (not in article, but which SSTST does thoroughly)	-Read from checklists every time do not rely upon memory -Benefits of checklists -Value is placed within multidisciplinary involvement	-Full implementation of checklists may not be occurring for multiple reasons	Level IV, Consensus/position statement

5. Weld, et al. (2016)	Qualitative	-Urology cases: --1513 surgical cases performed prior to TeamSTEPPS™ (TS) --1481 surgical cases performed after TeamSTEPPS™ --Evaluated categories: ---1st start cases ---turnover cases ---add-on urgent cases	TeamSTEPPS™ 4 core competencies (which richly compliments HRO) 1. leadership 2. situation monitoring 3. mutual support 4. communication -Concepts Based upon CRM, closed-loop communication, aviation industry principles	-Mean case times (including anesthesia and surgery times) decreased by 10.1% with TS -Pt safety issues were identified during post-op briefings and were analyzed -On-time start rate increased with TS --1. Mean case time decreased 12.7 minutes after TS (p <.001) --2. On-time first start rate improved 21% with TS (p <.001) --3. First start/turnover had no	-Staff time requirements for briefings pre- and post-op (pre= 30min prior, post <5min)	Level I, A-High Quality

				observable change with TS --4. Patient safety issues decreased from 16% to 6% at midyear of implementation and remained stable (p<.001)		
6. Clay-Williams, et al. (2015)	Qualitative	n/a	-Large scale implementation has conflicting outcomes that suggest tools (checklists) are not as simple or effective as hoped 1. World Health Organization (WHO) Universal Protocol (UP)	1. Back to Basics: Reserve the checklists (tools) for processes/procedures not discussion with simple easy to follow, standardized processes	Complex quality/safety solutions are never --a) singular --b) straightforward --c) simple to sustain	Level I, A-High Quality

			Structure varies design with aviation checklists as it combines *procedures* (which are linear) and then includes **within** checklists formal *team discussion (*which aviation sees as briefings, which execute a complex process, which aviation NEVER mixes in the cockpit) 2. The roles within the UP are not clear (who reads, checks, validates the checklist?) 3. Compliance requires boxes			

			to be checked (so team member is not able to perform other tasks, which they may be needed to perform during the time they are completing the checklist) 4. Requires a Time Out: ALL must stop, and this is not necessarily feasible in an emergent situation due to extreme time pressure			
7. Chassin, et al. (2013)	Mixed Methodologies Qualitative and Quantitative	5 Hospitals 3 ASCs	1.Using RPI improvements in outcomes have been noted 2. RPI is a combination of: a) Lean	1.First 4 projects (see First TST RPI attachment) -surgical booking prior to RPI 39% error rate after RPI 21%	n/a	Level I, A-High Quality

			b) Six Sigma c) Change Management 2. Operations on WSP approx. 50x's week – Mn Dept of Health (2013) High Reliability Healthcare Maturity Model 3. Adapting High Reliability Science to hospitals a) *leadership commitment* b) incorporate *principles/practice of safety culture* throughout the organization c) widespread *adoption and deployment* was most effective PI	error rate with a relative improvement of 46% (p= .000) 2. Regulatory mandates are unlikely to be effective in RPI efforts as they should focus on elements of RPI not obstruction of progress toward high reliability 3. HR w/ RPI is a systematic attention to uncovering the very specific causes of the failures of the safety processes, and can pinpoint specific causes 4. Fires in ORs ~600		

			tools and methods	x'/yr (ECRI Institute, 2013)		
8. Chassin. (2018)	Qualitative	n/a Zero harm goal	-Cincinnati Children's Serious Safety Events (SSEs) decreased by 80% and 80% decrease in lost time days after implementing HR principles -Memorial Hermann Health System's (MHHS) hand hygiene (HH) compliance improved from a 58% rate to a 96% compliance rate, one hospital within the system had zero Central Line Bloodstream Associated	-Both institutions had: -- a high degree of board involvement --a large number of safety initiatives including safety huddles at hospital daily observation briefs --were consistently excellent and safe across all services and settings	n/a	Level III, A-High Quality

			Infections for 12 months, and five hospitals had zero ventilator-associated pneumonias for 12 months directly attributed to improved HH			
9. Mason, et al. (2014)	Qualitative	Of 124 studies found with 8 database searches, 23 were suitable for inclusion within this article: 11-Lean 6- Six Sigma 6- Lean Six Sigma (LSS)	-Six common aims: 1. optimize outpatient efficiency 2. improve OR efficiency 3. decrease operative complications 4. decrease ward-based harms 5. decrease mortality 6. limit unnecessary costs and length of stay	-Major studies (88%) demonstrate improvement by utilizing LSS within healthcare -LSS QI methodologies have potential to have clinically significant improvement for surgical patients -LSS and SS prominent QI methodologies demo'd	-Selection bias due to being hospital-based patients -Possible QI strategies could be utilized in other specialties as not isolated to being helpful in surgical setting -In noting underreporting of QI research, and finding 88% statistically significant improvement in this study with principles, more research should be considered -Marked variations in settings for these QI studies interventions and countries where operated	Level V, A-High Quality

				across several areas of healthcare since 1998, use has increased by more than ½ within the last four years (reported in 2013)		
10. Reason. (2000)	Qualitative	n/a "Human Error Models and Management"	-2 approaches to human fallibility: a) Person-blame forgetfulness, intention, moral weakness b) System-concentrate conclusions on the conditions under which individuals work AND try to build defenses to avert errors or mitigate their effects	-Countermeasures directed at decreasing unwanted variability in human behavior	-Human Behavior	Level III, A-High Quality

			-Strive towards HRO principles			
11. Treadwell, et al. (2014)	Systematic Review of Literature	-Summarized four databases from 1 January 2000 to 26 October 2012 --33 studies --Utilizing UP, Surgical Patient Safety System (SURPASS), a wrong-site surgery checklist, or an anesthesia equipment checklist were eligible for inclusion -- also included articles describing use of anesthesia checklists to detect equipment failure in	-Surgical checklists represent a relatively simple and promising strategy for addressing surgical patient safety worldwide. -Beneficial effects strongly recommend R/T checklist compliance/completion -Further studies are needed to evaluate to what degree checklists improve clinical outcomes and whether improvements	-In industrialized countries, the rate of perioperative death directly due to inpatient surgery has been estimated at 0.4–0.8%, and the rate of major complications has been estimated at 3–17%.1 - complications include: -wrong patient/procedure/site surgery -anesthesia equipment problems	-Checklists are not a one size fits all and the WHO UP checklist has not yielded effects anticipated -A systematic review searched for literature and concluded there was ‘no literature to substantiate the effectiveness of the current Joint Commission Universal Protocol in decreasing the rate of wrong site, wrong level surgery	Level V- A, High-Quality

		simulated scenarios	may be more pronounced in particular settings. -UP none of eight sites had a ‘standard plan for intravenous access for cases of high blood loss’, or formal team briefings preoperatively or postoperatively. -In January 2004, the Joint Commission launched the first version of the UP for Preventing Wrong Site, Wrong Procedure, Wrong Person Surgery -Wrong-site surgery is rare; estimates	- lack of availability of necessary equipment -unanticipated blood loss - non-sterile equipment, and surgical items (eg, sponges) left inside patients - The complexity of most surgical procedures requires a well-coordinated team to prevent these events.		

			for various procedures range from 1 in 13,000 procedures for wrong-site anesthesia block to 1 in 4200 for wrong side ureteral stents -- A general systematic review estimated that the overall rate was 1–5 per 10,000 procedures.			
12. VanKlei, et al. (2014)	Quantitative retrospective cohort study	-25,513 patients eval in-hospital mortality after surgery over 30 days -ECRI Institute, Plymouth Meeting, Pennsylvania, USA	-Implementing WHO UP Surgical checklist decreased in-hospital mortality -Effects depend crucially on actual checklist completion	-Crude mortality dropped from 3.13% to 2.85% (p= 0.19)	-The study conclusion was not clear if the improvement was due to the utilization of the checklist or simply increasing awareness of patient safety -The improvement outcome was actually smaller than previously reported	Level V, A-High Quality

13. DeVries, et al. (2010)	Quantitative	-6 hospitals in 3 months were a baseline period and 3 months after were evaluated -Similar data was observed at 5 hospitals as a control population -3760 patients' records evaluated prior to safe surgery checklist implementation -3820 patients' records evaluated after safe surgery checklist implementation -Used multidisciplinary checklist	-Greater than ½ of all surgical errors occur ***outside*** the OR -The goal of this study was to target the entire surgical pathway -After implementation of complete checklist there was an association with decreased surgical complications and mortality in hospital with high standard of care	-Total number of complications with perioperative patients decreased: 27.3% (with a 95% CI [25.9-28.7]) to 16.7% (with a 95% CI [15.6-17.9]) absolute risk reduction of 10.6% (with a 95% CI [8.7-12.4]) -There was no change at all within the control hospitals	1.Because there were before and after phases, there could have been influence 2. Including prospective data could possibly have under-registration data inconsistency 3. Documentation of complications *limited* to period of admission; any data post-op could not be tracked	Level I, A-High Quality

14. Conley, et al. (2011).	Qualitative	-5 hospitals in WA -Conducted semi-structured interviews with implementation leaders and surgeons from September to December 2009	-Despite significant decrease in mortality and other post-op complications UP and SURPASS, real-world impact is likely to vary with effectiveness of each hospital's *implementation* of the process -If checklists are built with no appreciation for HOW it works, this ignores critical sociocultural dimension required for safer care. -Success implementatio	-If checklists are not explained and demonstrated this can lead to frustration, disinterest, and eventual abandonment	1.Survey was conducted via telephone with a sampling of WA hospitals which were selected by local hospital association 2. Organizations are at varying stages of readiness 3. Budget constraints did not allow site visitation 4. Results may not be a representative or complete sampling	Level V- C-Low Quality

			n is important related to the ability of leaders to *explain why AND show how to use the checklist*				
15. Paull, et al. (2014)	Quantitative	-The Veterans Health Administration (VHA) database of root cause analyses was queried for all cases involving an incorrect surgical procedure between 2004 and 2013 to determine the relative frequency and characteristics of wrong surgery events because of errors **upstream** and **downstream**	- Understanding why some of these events are not caught by the steps of the UP, culminating in the time-out, can help the field to add upstream and downstream safeguards to help prevent these never events -Wrong surgery events can and do occur despite adherence to	-Forty-eight cases of wrong surgery events because of **upstream/downstream** errors were analyzed, representing - 16% of the 308 root cause analyses for wrong surgery events reported during this period -Upstream errors included mislabeling of specimens, while	-The results from the VHA may not be generalizable to non-VHA patient populations - We did not review medical records because the cases are deidentified, but rather RCA reports, the latter often missing clinical details -Another limitation was in the calculation of harm for wrong patient surgery. A patient undergoing a prostatectomy inadvertently because of mislabeling of a previous prostate biopsy certainly was harmed. But what about the other patient who was erroneously notified that they had benign disease and the delay in care incurred? Notwithstanding these limitations, the study yielded sufficient information to **begin to characterize wrong surgery events associated**		Level I- A- High Quality

		to the *Universal Protocol* -This subgroup of wrong surgery events was selected from among all the wrong surgery events by 2 clinicians with expertise in patient safety (Kappa 5 .91)	UP including a time-out -The prevention of incorrect procedures requires complementary safety behaviors and technologies to address errors that occur **upstream and downstream** to the UP and the time-out	downstream errors were associated with ineffective intraoperative process -Surgical procedures that were particularly vulnerable included wrong level spine operations, wrong patient prostatectomies, wrong implant cataract procedures, and wrong site skin lesion excisions	**with errors upstream and downstream** to the UP that may not have been otherwise prevented by the UP, and allow those to be compared and contrasted with wrong surgery events that would have been prevented by the UP	
16. Eltorai. (2018).	Qualitative	-Lessons from the sky: an aviation-based framework for maximizing the delivery	-2 professions have substantial parallels - manage a crisis situation,	-Accident reporting and investigations -Simulation-based error analysis	-Medicine and Aviation have many parallels but many differences within the industries, some changes could be adapted by medicine from aviation	Level V, Integrative review

		of quality anesthetic care	where lives are at stake, at a moment's notice and with incomplete information - determinants of quality performance in both professions extend far beyond knowledge base and formal training - The science of **human factors**, a prominent cornerstone of the aviation industry, has not yet found the same place in medicine -could change the understanding and execution of medical			

			decision-making in profound ways -Specific components of crisis management and root cause analysis in aviation can serve as models for improving those same aspects within anesthesiology - Literature published within the aviation and human factors industries presents a unique lens through which anesthesiologists can view their own errors, challenges, and quests for improved			

			performance 1. Systematic error review and reporting, along with 2. Simulation-based studies of error mechanisms and quality improvement interventions, represent two major vehicles for advancement within anesthesiology that are already successfully demonstrated by the aviation industry			

Appendix B

Robust Process Improvement® Diagram

Joint Commission Center for Transforming Healthcare. (n.d.) *Facilitating change.*

https://www.centerfortransforminghealthcare.org/who-we-are/facilitating-change/

Appendix C

P Value Calculation for Baseline SS TST® Pre-Op Booking Data

Source: Center for Transforming Healthcare Aggregate Baseline Values for Pre-Op Booking

Total Observations = 12, 915
Baseline Observations = 5,735
Improve Observations = 7,180

Baseline Observations 5,735 x .55 = 3,154 Defective Observations
Improve Observations = 7,180 x .24 = 1,723 Defective Observations
P-value = 0.000

Descriptive Statistics

Sample	N	Event	Sample p
Sample 1	5735	3154	0.549956
Sample 2	7180	1723	0.239972

Estimation for Difference

Difference	95% CI for Difference
0.309984	(0.293756, 0.326213)

CI based on normal approximation

Test

Null hypothesis $H_0: p_1 - p_2 = 0$

Alternative hypothesis $H_1: p_1 - p_2 \neq 0$

Method	Z-Value	P-Value
Normal approximation	37.44	0.000
Fisher's exact		0.000

Appendix D

Stakeholder Analysis

Stakeholder Analysis					
Project:	Safe Surgery		Date	5-Dec-20	
Location/ Area	Role Type	Current Level of Buy In To Change (Rate 0-10 with 0 being no need)	Needed Level of Buy In (Rate 0-10 with 0 being no need)	Gap	Strategy to Close the Gap
OR	Perioperative Director	10	10	-	Very enthusiastic to implement SS TST within her department
OR	Lead Pre-Op Booking Scheduler	10	10	-	This team has verbalized frustration and recognition of lack of standardization with pre-op booking process
C-Suite	CNO	10	10	-	CNO quite interested to evaluate area for risk identification to standardize pre-op booking w SS TST
C-Suite	CMO or President of The Medical Staff	unk	unk	10	unknown at this time

Orthopedic	Service-Line Chief/Champion	unk	unk	10	unknown at this time
Corporate	Patient Experience	unk	unk	10	unknown at this time
Corporate	IT	unk	unk	10	unknown at this time
Pre-Admit Clinic	Patient Care Director	10	10	-	
Pre-Admit Clinic	Surgical Liaison RN	10	10	-	
C-Suite	Director of Quality Care and Patient Safety	10	10	-	

Appendix E

Baseline Data/ (redacted)

Appendix F

Most Prevalent Defects (redacted)

Appendix G

Gap Analysis

Gap Analysis:
Streamlining Surgical Scheduling Processes to Eliminate Never Events:
Utilizing The Joint Commission's Safe Surgery Targeted Solutions Tool©
(SS TST)

Category	Current State	Desired State	Identified Gap	Action Plan
Define	[redacted] Perioperative Staff Unaware of Wrong-Site Surgery(WSS)/ 'Never Event' Causes Utilizing Safe Surgery Targeted Solutions Tool (SS TST)	• Introduce SS TST Pre-op Booking Project to [redacted] with the goal including WSS events never occur, especially with surgical booking as a cause or contributing factor	• WSSs occur an estimated 40x's/week in US	• Evaluate potential causes for WSS
	Scope of Project Undefined	• Determine Scope of Project (select a small set of service group(s), to include services which require surgical marking with laterality (e.g., Ortho/Optho) also	• SS TST underutilized due to lack of publicity/knowledge of the tool's potential to impact a surgical services product line	• Define Scope and Disseminate information to key stakeholders

		consider patient volume of services selected		
	SS TST Pre-op Booking project is not tailored to highest defect/risk identification at [redacted]	• Tailor SS TST project tools to [redacted] Pre-op Booking by creating tools specific to this team	• Defects not measured or defined currently	• Implement tools tailored specifically to [redacted]'s greatest defects identified
	Safe Surgery Team is not defined	• No defined team members for SS TST/usual members include: Periop/OR Service Manager, scheduler(s), strong physician champion, project lead, service chief, CMO	• Identify 3-7 key people who will be part of this team/grant access to enter data/train data collectors	• Train key members on roles/responsibilities
[redacted]	Team members do not have SS TST database	• Team members must be added to SS TST	• Determine role team member will be	• Enter team members by name and role

	access		assigned within SS TST (this determines level of visibility of database)	into the SS TST
	Stakeholder Analysis Required at [redacted] Perioperative Department with Stakeholder defined as: Any group or individual that might be affected by the actions or interventions of your safe surgery team	• Identify stakeholders within the [redacted] Perioperative continuum to contribute to identification of pre-op booking risks which could contribute to WSS	• Incomplete awareness and approval from required stakeholders	• Schedule briefings/meetings/appointments with all stakeholders in a timely fashion to be able to implement study within proposed prospectus
	Charter must be developed for this project	• Develop Charter for this project utilizing SS TST Charter Development Template	• Charter is not complete	• Complete Charter development with SS TST Template
	Lean Six Sigma (LSS)/ Robust Performance	• Evaluate these proven tools which are utilized within	• These tools are not widely implemented	• HCOs have much to learn and gain from implementing these methodologies

	Robust Performance Improvement (RPI) Tools	are utilized within the SS TST to determine causes and proposed solutions from for pre-op booking staff and participating [redacted] physician offices to decrease WSS events	widely implemented and utilized throughout the healthcare industry at this time	methodologies within patient care, plan to validate and share these in widest possible manner
	Crew Resource Management (CRM) and **Team Strategies and Tools to Enhance Performance and Patient Safety** (TeamSTEPPS)	• Analyze how these principles fashioned from the aviation industry can be applied to improve communication among [redacted] and physicians' offices	• These tools are not readily implemented and utilized throughout healthcare at this time	• HCOs have much to learn and gain from implementing these methodologies within patient care, plan to validate and share these in widest possible manner
	High Reliability Organizations (HROs)	• Analyze HRO principles and examine how they may be utilized within the pre-op booking arena at	• These tools are not readily disseminated and/or implemented throughout healthcare at this	• HCOs have much to learn and gain from implementing these methodologies within patient care, plan to validate and share these in widest possible manner

	Connection required [redacted] for [redacted]	booking arena at [redacted] to achieve "zero preventable harm" • Obtain access to SS TST for [redacted] to utilize the SS TST RPI/LSS methodology to develop a systematic identification of defects/risks within the pre-op booking continuum	healthcare at this time • [redacted] does not have measured or quantified potential risks within their pre-op booking arena	• [redacted] will have defined/identified defects within their pre-op booking process

Measure	Assessment of existing literature regarding pre-op scheduling processes	• There is not much which has been performed within this realm	• Lack of research in this arena	• Continue to evaluate research which evaluates contributory factors to WSS
	Perform Gap Analysis to assess projected barriers, stakeholders and need(s) for improvement at [redacted]	• Ascertain causes within [redacted] surgery booking that are defects/risks to WSSs	• Causes are not readily identified throughout the perioperative continuum at [redacted] for WSS	• Measure data within SS TST
	Measure [redacted] baseline pre-op booking defects/risks for WSS from SS TST Database Entries with minimum 100 initial observations entered by physician ID/code	• Calculate and disseminate to stakeholders these findings and common causes	• Causes are not readily identified throughout the perioperative continuum at [redacted] for WSS	• Measure data within SS TST
	Evaluate Baseline Metrics for [redacted] Data Within SS TST	• Develop large database for national and worldwide distribution of commonalities	• Minimal non-aggregate data found upon researching topic	• Measure data within SS TST

Analyze	No apparent standardized Methods Utilized to Schedule Surgical Cases at [redacted]	• Multiple entry points to schedule surgeries at [redacted]	• No apparent standardized process(es) for surgical schedulers to follow to decrease risk of defects	• Work to create standardized processes to decrease risk
	Identified Root Causes for Potential Surgical Scheduling Errors	• Determine those Root Causes which could have contributed to WSS	• Very few entities have studied these root causes	• Evaluate root causes, consolidate common findings, disseminate widely
	No methods exist for pre-op booking standardization	• Create standardized mechanisms for HCOs to follow regarding Surgical Booking	• Very few entities have standardized surgical scheduling processes within their HCOs	• Create standardized mechanisms (Solutions) for HCOs to follow regarding Surgical Booking to decrease WSSs
	Methods for Surgical Scheduling Improvement via LSS, RPI, CRM/TeamSTEPPS, HROs	• Utilize and share successful tools whereby being able to decrease variance, increase predictability, and	• Healthcare teams are not familiar with these tools utilized within other industries which have identified inefficiencies and	• Utilize and share successful tools whereby being able to decrease variance, increase predictability, and

		processes	causes for errors	processes
	Review baseline data within the SS TST with the project team	• Share defect data utilizing the Proportion (P) Chart, Pareto Chart, and the Analysis of Means (ANOM) Chart	• [redacted] is unaware of the potential risk for WSS due to lack of analysis of the process	• Look at marketing strategy to share these best practices [redacted]
	Schedule a meeting with leadership	• Share defect data utilizing the Proportion (P) Chart, Pareto Chart, and the Analysis of Means (ANOM) Chart	• Leadership is unaware of the potential risk for WSS due to lack of analysis of the process	• Look at marketing strategy to share these best practices [redacted]
	Completing data collection is required	• Begin implementation of targeted solution strategies	• Targeted solutions to decrease defects within pre-op booking have not been implemented	• Identify which targeted solution sets will target

Implement Solutions	Change Management Strategy has not been implemented	• Implement Change Strategy with targeted solutions throughout [redacted] Perioperative process	• Leadership is unaware of Change Management strategies from SS TST	• Look at marketing strategy to share these best practices [redacted]
	Members of the [redacted] Perioperative staff have not implemented Change Management	• Train Just-in-time coaches (e.g., service line manager, preceptor of new staff, OR management staff, physician champion, unit manager of pre-op area)	• SS TST Change Management tools have been unavailable to peri-operative leadership staff	• Share SS TST Change Management tools [redacted]
	Leadership at [redacted] Perioperative Team unaware of TST Tools to implement solutions	• Utilize TST Tools to implement solutions (Change Management Implementation Guide, Just-in-time Coach scripts, Tips for Writing Policy, Improvement Phase	• Implementation Strategies have not been introduced to [redacted]	• Share Implementation Strategies with Perioperative Leadership at [redacted]

		Improvement Phase Letter to Stakeholders)		
	Consolidate Findings Regarding Surgical Scheduling	• Distribute findings throughout healthcare industry	• There are few, if any, aggregate data findings disseminated at this time	• Determine a mechanism to distribute findings throughout healthcare industry
	Develop Recommended Standardized Process(es) for Surgical Scheduling Based Upon Identified Causes for Errors	• Create data-driven Safe Surgery Booking standardization across the industry	• There is no surgical booking standardization discovered at this time	• Determine methods to create data-driven Safe Surgery Booking standardization across the industry
	Consolidate Proven Improvement Methods	• Recognize marked decrease or elimination of WSSs	• Surgical booking is a continued contributing factor to WSSs	• Contribute to recognize marked decrease or elimination of WSSs in some measurable capacity
	Create Strategy to	• Open		• Readily share best practices among

	Create Strategy to Share Best Practices Recognize Not 'One Size Fits All' for Recommended Strategic Improvements	• Open communication across healthcare continuum regarding best practices • Realize differing strategies and differing checklists work differently for differing HCOs, but some degree of standardization is feasible and prudent	• Best practices are not developed, collated or shared within the literature search • There is no published standardized checklist, such as the Universal Protocol, that includes evaluation of surgical booking processes	• Readily share best practices among HCOs nation-wide and ultimately world-wide • Attempt to create a tool for surgical booking staff to utilize including requisite components to decrease WSSs

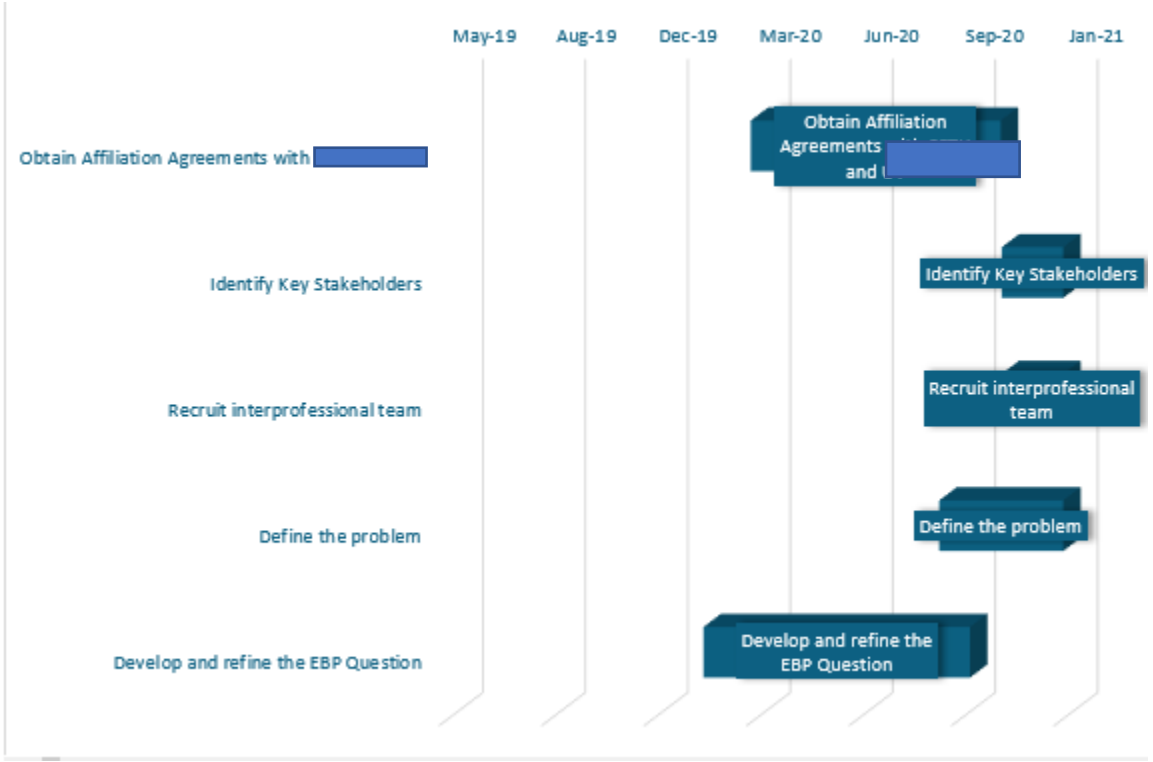
Control/Sustain the Gains	[redacted] Perioperative Leadership currently unfamiliar with SS TST implementation guide	• Demonstrate consistent leadership help with the implementation guide	• [redacted] Perioperative Leadership does not have access to SS TST currently	• Procure access to the SS TST implementation tools and guides
	Defect/risk data is currently unavailable as no observations have been collected	• Collect succession data	• Defect/risk data has not been evaluated as a factor which will potentially facilitate a WSS	• Make observations of potential defects/risks potentiating WSS possibilities
	Data performance results have not been collected	• Share data performance results with staff on a regular basis	• Performance risks are unknown to [redacted] at this time	• Utilize SS TST to determine performance actions which could lead to WSS
	Processes are not predictable currently; all physicians' offices are performing pre-op booking independently	• Use TSTs with the goal to make processes predictable	• Predictable processes are not in place regarding pre-op scheduling from physicians' offices	• Implement standardized processes for physician offices to adhere to in order to decrease defects/risk

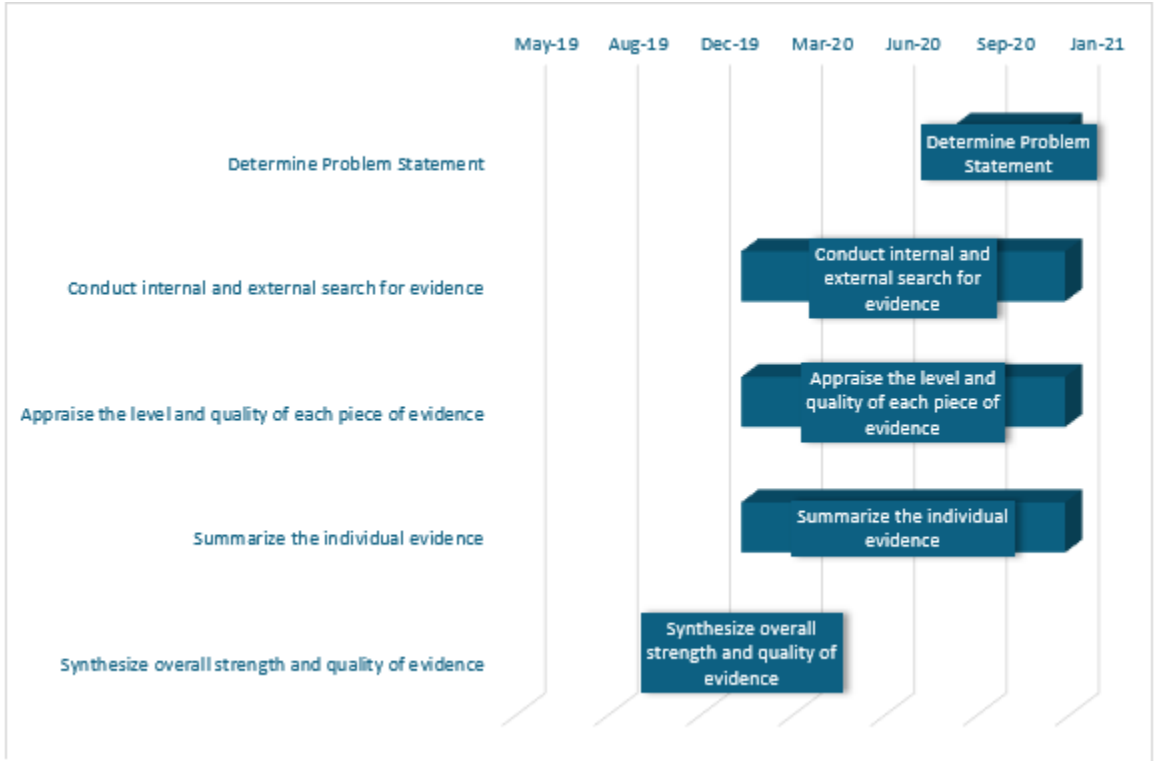
	Coaches are not recognized at this time as a required entity within the pre-op booking continuum	• Utilize trained Just-in-time coaches	• Coaches are not yet identified nor trained regarding the solution sets within the SS TST	• Identify and train coaches as stakeholders within the pre-op booking realm
	Tools created by CTH are not currently available to establish or maintain optimal performance	• Utilize tools available: Maintaining Optimal Performance, Developing your control plan, Replicate results, Review Solutions	• Tools are unavailable to the pre-op booking staff	• Ensure pre-op booking staff are equipped with available and necessary tools to sustain gains from utilization of the SS TST
	Environments have not been established which are able to sustain improvements	• Desire to reach a state of improved processes for standardizing surgical booking that reduces WSSs and sustain those improvements	• No standardized processes with proven strategies for reducing WSSs to be sustained	• Evaluate data from SS TST, specifically evaluating the surgical booking component, to evaluate suggested solutions for sustainment to decrease and ultimately eliminate WSS events

	Environments have not been established which are able to spread improvements	• Desire to reach a state of improved processes for standardizing surgical booking that reduces WSSs and spread those improvements across the healthcare continuum	• No standardized processes with proven strategies for reducing WSSs to be spread	• Evaluate data from SS TST, specifically evaluating the surgical booking component, to evaluate suggested solutions for spread of mechanisms to decrease and ultimately eliminate WSS events

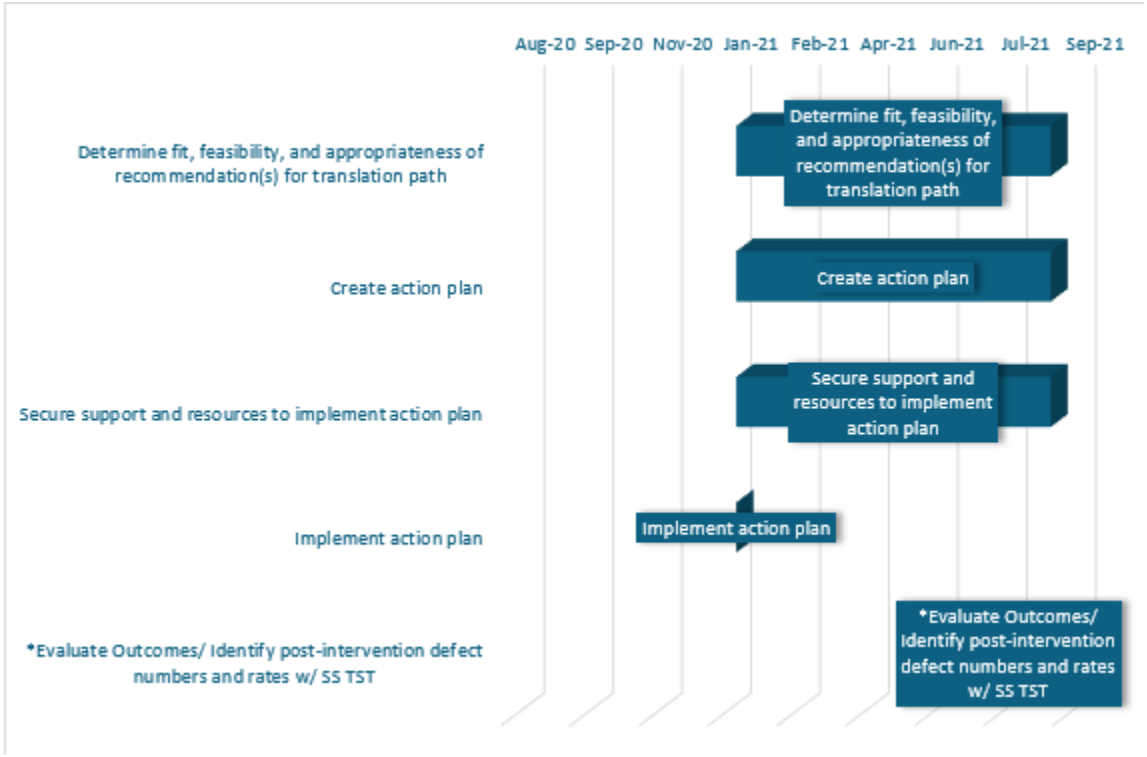
Appendix H / Gantt Chart

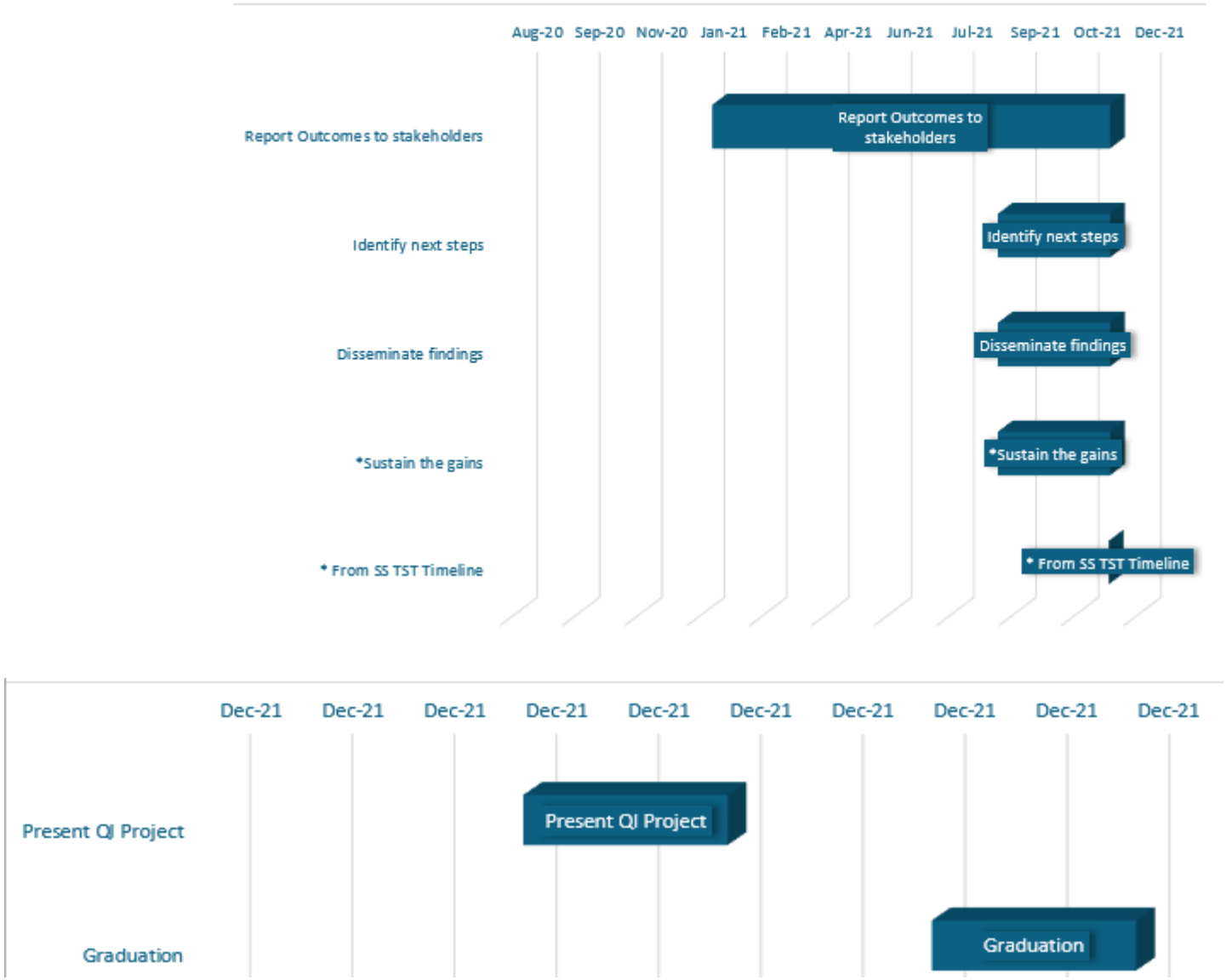
Position	Start Date	End Date	Milestone/Activity
1	3/1/2020	10/30/2020	Obtain Affiliation Agreements
2	11/1/2020	12/30/2020	Identify Key Stakeholders
3	11/1/2020	12/30/2020	Recruit interprofessional team
4	9/1/2020	12/30/2020	Define the problem
5	1/15/2020	9/30/2020	Develop and refine the EBP Question
6	9/1/2020	12/30/2020	Determine Problem Statement
7	1/15/2020	12/30/2020	Conduct internal and external search for evidence
8	1/15/2020	12/30/2020	Appraise the level and quality of each piece of evidence
9	1/15/2020	12/30/2020	Summarize the individual evidence
10	1/15/2020	12/30/2020	Synthesize overall strength and quality of evidence
11	1/15/2020	12/30/2020	Develop recommendations for change based on evidence synthesis
12	1/15/2021	8/30/2021	Schedule Team Meetings Every other Weds at 1530CST
13	1/15/2021	3/30/2020	Obtain baseline preop contributing factors determine top 2
14	1/15/2021	3/30/2021	Train data collectors
15	3/30/2021	7/30/2021	Implement Solutions Measuring Improvement
16	1/15/2021	8/30/2021	Determine fit feasibility appropriateness of recommendations for translation path
17	1/15/2021	8/30/2021	Create action plan
18	1/15/2021	8/30/2021	Secure support and resources to implement action plan
19	1/15/2021	8/30/2021	Implement action plan
20	7/1/2021	8/30/2021	Evaluate Outcomes Identify post-intervention defect numbers and rates w SS TST
21	1/15/2021	11/29/2021	Report Outcomes to stakeholders
22	9/1/2021	11/29/2021	Identify next steps
23	9/1/2021	11/29/2021	Disseminate findings
24	9/1/2021	11/29/2021	Sustain the gains
25	12/15/2021	12/15/2021	Present QI Project
26	12/17/2021	12/17/2021	Graduation


May-19
Aug-19
Dec-19
Mar-20
Jun-20
Sep-20
Jan-21
Obtain Affiliation Agreements with
Identify Key Stakeholders
Recruit interprofessional team
Define the problem
Develop and refine the EBP Question
Obtain Affiliation Agreements
Identify Key Stakeholders
Recruit interprofessional team
Define the problem
Develop and refine the EBP Question

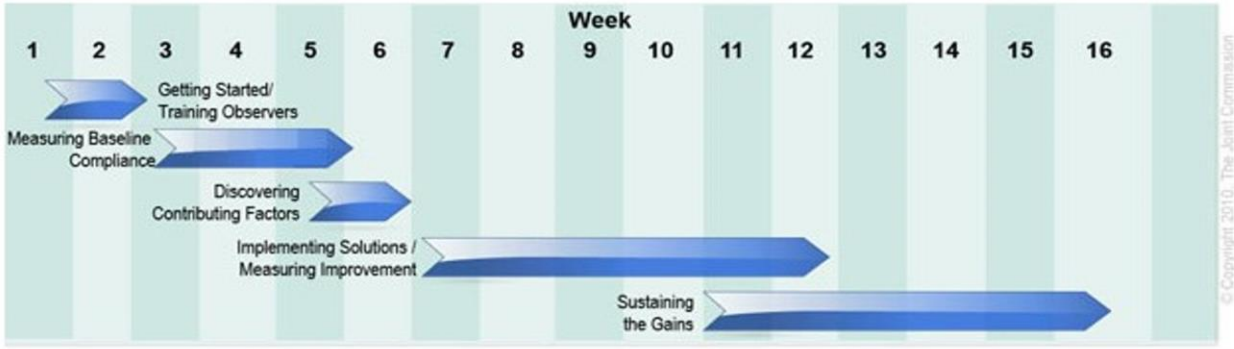

May-19
Aug-19
Dec-19
Mar-20
Jun-20
Sep-20
Jan-21
Determine Problem Statement
Conduct internal and external search for evidence
Appraise the level and quality of each piece of evidence
Summarize the individual evidence
Synthesize overall strength and quality of evidence
Determine Problem Statement
Conduct internal and external search for evidence
Appraise the level and quality of each piece of evidence
Summarize the individual evidence
Synthesize overall strength and quality of evidence


Feb-15
May-15
Aug-15
Dec-15
Mar-20
Jun-20
Sep-20
Jan-21
Apr-21
Jul-21
Oct-21
Develop recommendations for change based on evidence synthesis
Schedule Team Meetings (Every other Weds at 1530CST)
*Obtain baseline pre-op contributing factors/ determine top 2
*Train data collectors
*Implement Solutions Measuring Improvement
Develop recommendations for change based on evidence synthesis
Schedule Team Meetings (Every other Weds at 1530CST)
*Obtain baseline pre-op contributing factors/ determine top 2
*Train data collectors
*Implement Solutions Measuring Improvement


Aug-20
Sep-20
Nov-20
Jan-21
Feb-21
Apr-21
Jun-21
Jul-21
Sep-21
Determine fit, feasibility, and appropriateness of recommendation(s) for translation path
Create action plan
Secure support and resources to implement action plan
Implement action plan
*Evaluate Outcomes/ Identify post-intervention defect numbers and rates w/ SS TST
Determine fit, feasibility, and appropriateness of recommendation(s) for translation path
Create action plan
Secure support and resources to implement action plan
Implement action plan
*Evaluate Outcomes/ Identify post-intervention defect numbers and rates w/ SS TST

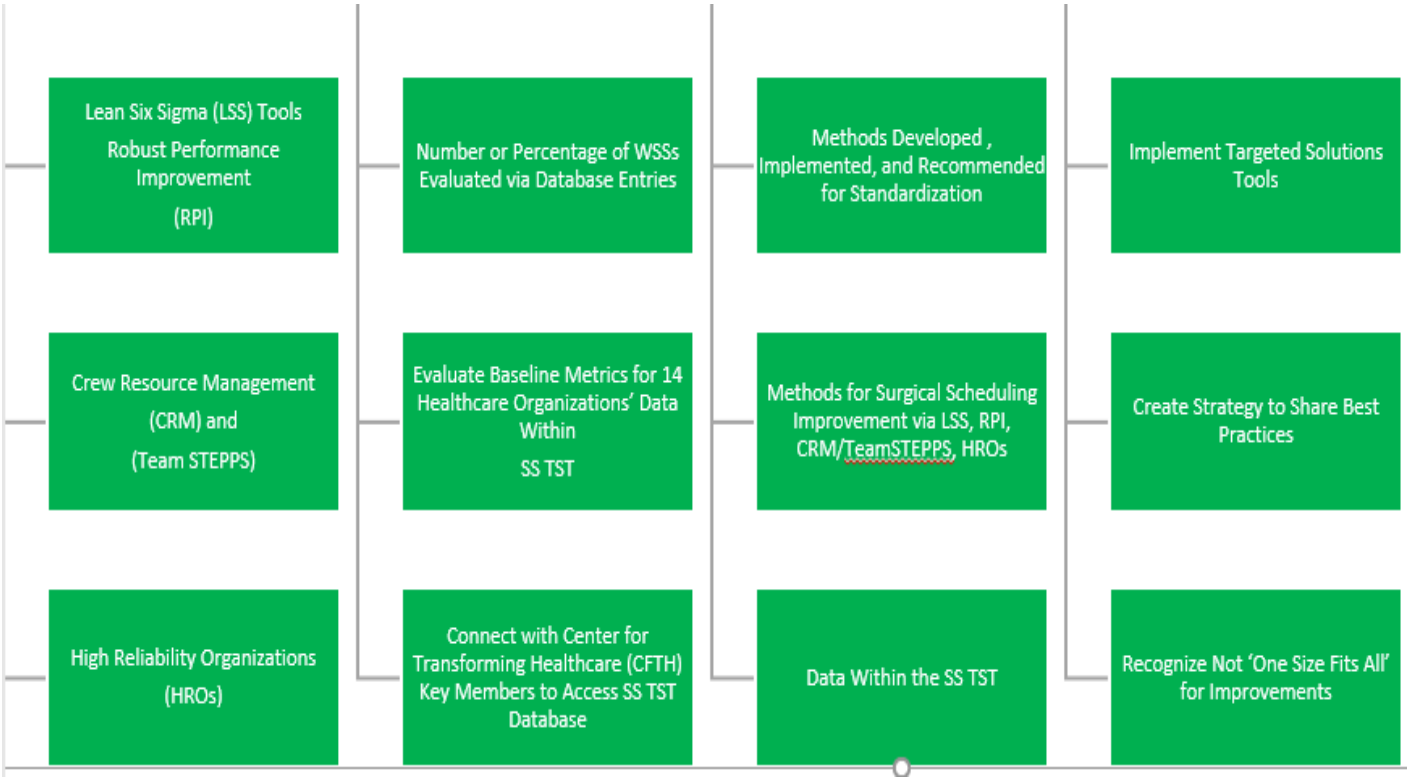

Aug-20
Sep-20
Nov-20
Jan-21
Feb-21
Apr-21
Jun-21
Jul-21
Sep-21
Oct-21
Dec-21
Report Outcomes to stakeholders
Identify next steps
Disseminate findings
*Sustain the gains
* From SS TST Timeline
Report Outcomes to stakeholders
Identify next steps
Disseminate findings
*Sustain the gains
* From SS TST Timeline
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Dec-21
Present QI Project
Graduation
Present QI Project
Graduation

SS TST Projected Timeline



Appendix I

Work Breakdown Structure


Lean Six Sigma (LSS) Tools
Robust Performance Improvement
(RPI)
Crew Resource Management
(CRM) and
(Team STEPPS)
High Reliability Organizations
(HROs)
Number or Percentage of WSSs Evaluated via Database Entries
Evaluate Baseline Metrics for 14 Healthcare Organizations' Data Within
SS TST
Connect with Center for Transforming Healthcare (CFTH) Key Members to Access SS TST Database
Methods Developed , Implemented, and Recommended for Standardization
Methods for Surgical Scheduling Improvement via LSS, RPI, CRM/TeamSTEPPS, HROs
Data Within the SS TST
Implement Targeted Solutions Tools
Create Strategy to Share Best Practices
Recognize Not 'One Size Fits All' for Improvements

Appendix J

Responsibility/ Communication Plan/ Charter

Communication	Method	Frequency	Goal	Owner	Audience
Kickoff Meeting with Stakeholders	Via Zoom	Once	Meet and greet. Discuss Objectives and Goals.	Project Manager	*Project Team *Project Manager *Project Sponsor
Project Charter	Zoom	Once	Charter is reviewed, edited and accepted by the stakeholders and sponsor.	Project Sponsor	*Project Stakeholders * Project Sponsor * Project Manager
Project Status Report, Follow Gantt Chart with Timelines	Skype calls	Weekly Task Updates	Review status of the project and discuss potential issues, barriers and delays.	Project Manager	*Project Team *Project Manager Project
Project Review	Zoom	At Gantt Chart Milestones	Project deliverables, feedback, discuss next steps.	Project Manager	*Project Team *Project Manager
Team Debrief and Analysis	Zoom	One Time meeting	Discuss findings, which were successful solution sets, and which were not.	Project Manager	*Project Team *Project Sponsor

Charter

Charter	Safe Surgery				
Business Case:	**Issue/Problem/Purpose:**			**Role**	**Name**
Patients have experienced wrong site, wrong procedure and wrong patient surgeries and action is being taken to eliminate these failures. The organization wants to reduce the probability of wrong site surgery and install sustainable process quality controls. We are committed to working with physicians, staff and facilities to ensure that we continue to advance high quality care in the safest	**Institutions and their patients experience wrong site, wrong procedure and wrong patient surgical procedures**			**Sponsor name:**	**CNO**
				Physician Champion name:	**Service Line Champion**
	Defect: *How we sense a failure in the product or service*	**Wrong site, procedure and/or patient surgery**		**Physician Leader name:**	**Chief of Medical Staff**
Metric to Improve	**Current**	**Goal**	**Date to Achieve**	**Nurse Leader name:**	**Perioperative Director**
% Defects/Opportunity Using CTH Preop and OR process designs	N/A due to redesign of perioperative process and CTQs	20.00%	1-Jun-21		
Number of wrong surgeries annually	Zero	Zero		**Project Leader:**	**Becky Poths**
Financial Impact: Cost of failure	**Type of Impact**	**Traceable**	**Non-Traceable**		
	$ Annualized Amount	$134,064	~$179,000		
Scope: Process Begins and Ends when....	**Scope: What must be included or excluded is...**			**Team Members**	
Begins at the time of surgical booking and ends with confirmation that the last intended surgery was performed.	Includes: *Orthopedics and Cardiovascular Services* Excludes: All procedures performed outside of an operating room			CORE	Perioperative Director
				CORE	Patient Services Director
				CORE	Surgical Liaison RN
				CORE	Lead Surgical Scheduler
				CORE	Director Quality and Patient Safety

High Level Project Plan:					Subject Matter Expert	Data Analyst
Phase	Planned Start Date	Planned End Date	Actual Start Date	Actual End Date	Subject Matter Expert	Director Risk Management
Charter signed (TST section 1 completed)	1/18/21	2/8/21	2/8/21	3/1/2021		
Trained Data Collectors (TST Section 2 completed)	2/8/21	3/1/21	4/1/21	4/23/21		
Baseline Data Collected and Entered (TST Section 3 completed)	3/1/21	4/1/21	4/1/21	4/23/21		
Determine primary contributing factors (TST Section 4 complete)	4/1/21	5/1/21	4/23/21	5/1/21		
Implement Improvements and begin improve phase data collection (TST Section 5 completed)	5/1/21	5/31/21	5/3/21	? 10/1/21		
Implement control plan (TST Section 6 complete)	6/1/21	6/30/21	? 10/1/21	12/1/21		

Appendix K

SWOT Analysis

SWOT Analysis/ Targeting Pre-Operative Booking Processes to Decrease Risk of "Never Events"

STRENGTHS (internal): • Supportive leadership -CNO and Perioperative Director • Multiple entities recognize lack of pre-op booking standardization • Very Performance Improvement-Driven Organization • Three-time Magnet© Recognition Facility w/ EBP reigning throughout • While not an employee, have been shadowing, meeting staff for ~3mos	WEAKNESSES (internal): • Project lead does not know CMO or Product Line Chief • Unknown actual timeline • Unsure if upon initial evaluation will actually find defects • Lack of contacts internally (not DNP project lead employer)
OPPORTUNITIES (external): • Ability to consolidate proven improvement methods • Outside hospitals/healthcare organizations (HCOs) able to learn from TST data • Ability to potentially publish aggregate findings to aid other HCOs' progress to decrease WSS • Ability to utilize RPI, LSS, CRM, HRO principles • Create strategy to share best practices with external organizations • There is a definite need for more research regarding surgical scheduling/booking • With COVID-19 there have been positive changes requiring a greater number of steps pre-operatively to decrease 'rapid add-ons'	THREATS (external): • Not adequate research on surgical scheduling/booking and contributing factors for WSS • Not one size fits all for checklists or HCOs/settings • Multiple entry points into surgical scheduling • Often physician offices have no direct affiliation with the location surgery is performed • Physician offices deal with multiple HCOs

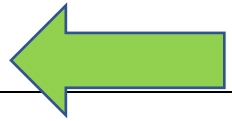
Appendix L

Budget

Staff

Costs & Budget

Category	Training Hours	Key Stakeholder Group Hours	Cost/Yr1 (avg annual inflation= 3.7%)	Yr 2	Yr 3
Project Lead		40 hours/week/ 2weeks per month	$44,800	$45,427	$46,062
RN Consultant		(once a month consultation x1 hour x4 months) =$224	$224	$227.13	$230.30
Data Analyst Consultant		(data extraction) (x10 months x 4 weeks/month (once a week) x1 hour each week	$2400	$2434	$2468
Project Oversight Consultant		x10 months x 4wks/month (once a week) x1 hour each week	$4800	$4867	$4935
Peri-op Director		2x's a month x1 hr x10 months)	$2400	$2434	$2468
CNO		support/Stakeholder update meeting 2 x's/month= x4	$4800	$4867	$4935

		hrs/month x 10 months			
Anesthesia Champion		(2x's a month x 10 months $178/hr)	$3650	$3701	$3753
Chief of Medical Staff		(2 x's a month) x 2 hrs	$1471.80	$1491	$1512
Hospital Surgical Schedulers	x 8 hrs/month x 10 months		$1325.60	$1344	$1363
Physician Office Surgical Schedulers	x 4 hrs/month x 10 months		$662.80	$672.07	$682
TOTALS Costs for 3 years: $202,411.20			$66,534.20	$67,466	$68,411

IT Cost Estimates

[redacted]-QUOTE	Estimates	Estimates	Estimates
Labor	**Developer Hours**	**Days of Work**	**Dollars**
Initiation, meetings	20	2.5	1600
Planning	20	2.5	1600
Requirements documentation	40	5.0	3200
Design documentation/review	20	2.5	1600
Coding	500	62.50	40,000
Code review / re-code	40	5.0	3200
DIT testing	40	5.0	3200
Defect fixes	80	10.0	6400
Production Go-Live Activities	16	2.0	1280
Production Install	8	1.0	640
Post-production warranty support	40	5.0	3200
Project-related administrative time	20	2.5	1600
Total Labor/Cost	844 developer hrs	105.50 days	$67, 520.00

TOTAL Investment= $66,534.20 staffing costs + $67,520.00 IT Upgrade Costs =

$134,064.20

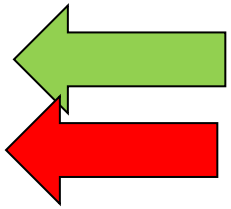
Budget (cost avoidance)

- Cost avoidance should be handled differently as a **cost benefit analysis** or **cost effectiveness analysis**.
- Cost for loss of limb/life (avg $179K) *National Practitioner Data Bank*
- Decrease/eliminate Perioperative Director and Patient Care Director daily texts/emails to confirm Pre-Admit Orders and for OR schedule day prior to surgery
- Standardize process to decrease deviation/increased risk (eliminate redundancy and cost associated with this)
- Decrease eliminate wasted OR time and opened/unused sets if wrong procedure or wrong approach set up (est. $16/min OR time, exclusive of Anesthesia or Surgeon avg $320/wrong side-wrong approach surgical set-up delays and cost)

Budget (cost avoidance)

Mitigating Strategy	Cost Avoidance/Yr1	Yr2	Yr3
Cost for WSS avg (NPDB)	~$179,000	$181,506	$184,047
Decrease/Eliminate Periop and Surg Services Directors Texts/Emails daily	~$62,400/yr	$63,234	$64,119
Standardize Process/decrease surgical schedulers' on-phone hold time & RN "wasted" time Pre-Admit Clinic for patients arriving without orders (See graph below)	~$44,989.56	$45,619.41	$46,258.08
Decrease/eliminate wasted OR time and opened/unused sets if wrong procedure or wrong approach set up (avg	est. $16/min OR time, exclusive of Anesthesia or Surgeon, avg $320/wrong side-wrong approach	$325 x 288/yr $93,600	$370 x 288/yr $106,560

20 min turnover time to set up for new case)	surgical set-up delays and cost ~288/year= $92,160		
TOTALS Cost Avoidance due to harm x3 years	$378,549.56	$383,959.41	$400,984.08 $1,163,493.05

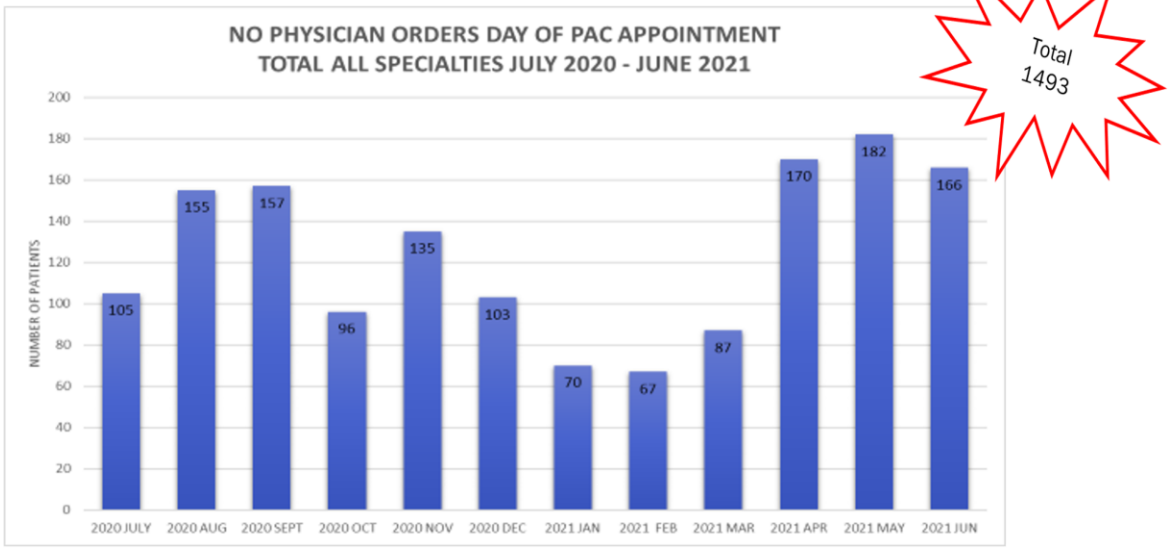


Assumptions:

1. **Per National Practitioner Data Base (NPDB) Mortality Rate for WSS 13.9% with a mean liability rate of $179K.**
2. **# of events and patient days same in baseline periods (by definition, no events are prevented in baseline periods)**
3. **Adverse Event Rate current baseline 75%**
4. **Will see decreased # of events by ~50% each period Q1-Q4**
5. **Annual Inflation Rate of 1.4%**
6. **Salaries based off salary.com**

Cost Avoidance / Data for Patients Arriving to Pre-Admit Clinic Without Orders

Vast Amount "Wasted" Time (patients & staff) & $ Spent on Pre-Op Process /Average >100 pts/month



Appendix M
Post Intervention Data (redacted)

Appendix N
Data Collection Instrument (redacted)

Appendix O

Surgical Scheduler Pre and Post Intervention Data

Pre-Intervention Responses

I was trained for and have been in my current pre-operative scheduling position for:	I understand all the components that make up the entire pre-operative process, from initial surgical booking to the patient going to the Operating Room	I have been trained to do my surgical scheduling job well	I can schedule a surgical procedure at MHTW in one step (for example: 1 phone call, 1 online submission, 1 fax)	My level of frustration with the current surgical scheduling process is:	It is necessary for me to correct surgical booking information due to inaccurate or incomplete initial surgical booking information	Considering the current surgical booking process, what would you like to see improved?	What do you use that you find helpful (or not helpful) in your surgical scheduling process?
Response: **(Less than 6 months)** **(6 months-1 yr)** **(More than 1 year but less than 3 years)** **(3 years or more)** **(I was never formally trained for this role)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1= "no frustration at all"** **5= "very high"**	**Scale: 1-5** **1= "never"** **5= "always"**	**Open response**	**Open response**

Less than 6 months	3.5	3.5 (due to lack of time for this to happen)	2	3	2.5 (usually lack of rep or equipment information. Schedulers in Drs offices do not know all this information. We also get discrepancy notices and have to verify the procedure)	-Drs offices scheduling their own reps or at least telling us who they need and phone #s. Telling us what equipment they need for the surgery- not assuming we know. -Updated phone list for Dr offices and reps. -A program that automatically chooses the correct procedure card.	***Not helpful***: online forms, if they do not fill out **everything** ***Helpful***: Huddle (very informative) -Old schedules are useful to see what was used in the past for surgeries (when choosing procedure cards) *Having a strong lead (Amy) is very helpful, she is always available to help *Online forms that are filled out completely (*VERY helpful)
3 years or more	5	5	3 Depends on the type of booking process Phone=yes Online/fax= 50/50	4 Only when information is missing and the office states they are unable to provide or don't know and it's a key element of the process	5	-Complete accurate orders -Full disclosure of case to be scheduled, reps needed, equipment needed, etc.	Making myself knowledgeable of what's needed for cases and what questions to ask to obtain that information

3 years or more	5	5	4	2	2	-Better communication electronically. Nothing should take hours to be placed in any system. -PAT reviewing orders better. 99% of calls to the office to ask questions could be answered by reviewing all documentation	-Least favorite: Pre-service Center! No need to call back-to-back-to-back (once had 10 missed calls in 15 minutes) LOVE how helpful everyone is from OR Scheduling to PAT scheduling. We are so GRATEFUL!
3 years or more	4	4	5	2	3	Available OR dates/times	N/A

I was never formally trained for this role	4	4	3	2	2	Hold time to speak to scheduler	N/A
More than 1 year but less than 3 years	3	3	4	3	3	1) shadowing or cross training to understand the whole process 2)Job Duties to be rotated so everyone can keep up with all the constant changes 3)Standard online booking form with complete required information 4) to come up with an online scheduling change form for all corrections after the case has been booked for tracking	

						purposes 5) All scheduling tools to be available online with access to update information since the information is constantly changing, this would help save time trying to track down the information and it would be available to all if needed when other co-workers are unavailable to ask. (example: Dr. office schedulers names and contact information)	

Post-Intervention Responses

I was trained for and have been in my current pre-operative scheduling position for:	I understand all the components that make up the entire pre-operative process, from initial surgical booking to the patient going to the Operating Room	I have been trained to do my surgical scheduling job well	I can schedule a surgical procedure at MHTW in one step (for example: 1 phone call, 1 online submission, 1 fax)	My level of frustration with the current surgical scheduling process is:	It is necessary for me to correct surgical booking information due to inaccurate or incomplete initial surgical booking information	Considering the current surgical booking process, what would you like to see improved?	What do you use that you find helpful (or not helpful) in your surgical scheduling process?
Response: **(Less than 6 months)** **(6 months-1 yr)** **(More than 1 year but less than 3 years)** **(3 years or more)** **(I was never formally trained for this role)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1 = (strongly disagree)** **5= (strongly agree)**	**Scale: 1-5** **1= "no frustration at all"** **5= "very high"**	**Scale: 1-5** **1= "never"** **5= "always"**	**Open response**	**Open response**

More than 1 year but less than 3 years	5	5	2	4	4	I would like to see everyone using an updated online scheduling form that has all fields marked required so they can't skip over it, so we can get all required information to complete the scheduling process, without having to pick up the phone to call to get the info, saves time and money if done correctly the first time.	1)I think it is very helpful for the office schedulers to attach copies of insurance cards to their online orders so that we can get the insurance put in correctly when scheduling because a lot of the schedulers have no idea of what the patient's insurance is. Medicare Advantage plans, etc. It's a lot easier to put in the insurance info if you have copies of the cards. Also saves time and money for the billing office having to go back and correct it. 2)I also think it would be helpful for the offices to attach a copy of the Dr.'s orders, this would prevent any

							errors in the scheduling process. 3)I have been scheduling for a while and I have taken a lot of calls from all the offices. Most of the time they are calling in between patients and are in a hurry, which I have seen over and over again that not all information is complete. Then it requires more phone calls back and forth. We get a lot of discrepancies that need to be fixed. All changes should also have to be done online to track when and who made the changes. 4)I think this all would be so helpful. More efficient, less errors, and complete orders being scheduled. This would also open up the phone lines for "Next Day" add-ons.

Less than 6 months	4	4	3	2	2	Seeing 100% (or close to that) Participation by the doctor's offices	The online scheduling. It is all written in front of you, so there are no misunderstandings. (LOVE) And the office schedulers do not have to wait on hold for us to answer the phone. Thank you for all of your hard work on this project!
3 years or more	5	5	5 -but it depends on the circumstances: --type of procedure --which office is scheduling	3 -it could definitely be improved	5	Accurate information for what is necessary for case: -procedure to be performed -equipment needed -vendors that are required	Researching the types of cases we perform. Making myself familiar with what is required and not being afraid to ask questions or seek out someone that can answer those questions

Appendix P

Surgical Scheduler Quality Improvement Questionnaire

Pre-Operative Scheduling Process - Baseline Assessment

Start of Block: Default Question Block

This survey should take approximately 10 minutes to complete.

This purpose of this survey is to assess the pre-operative booking process used by [redacted]. The information you provide will help develop a standardized process and training. Your identity will remain confidential, and your answers will only be reported in the aggregate.

Q1

- ○ I agree. Proceed to the survey.
- ○ No thanks. Please close survey.

Q2 I was trained for and have been in my current pre-operative scheduling position for:

- ○ Less than 6 months
- ○ 6 months to1 year
- ○ More than 1 year but less than 3 years
- ○ 3 years or more
- ○ I was never formally trained for this role

Q3 I understand all the components that make up the entire pre-operative process, from initial surgical booking to the patient going to the Operating Room.
On a scale of 1 to 5, 1 being "strongly disagree" to 5 "strongly agree."

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Q4 I have been trained to do my surgical scheduling job well.
1= strongly disagree to 5= strongly agree

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Q5 I can schedule a surgical procedure at [redacted] in one step (for example, 1 phone call, 1 online submission, 1 fax).
1= strongly disagree to 5= strongly agree

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Q6 My level of frustration with the current surgical scheduling process is:
1 = "no frustration at all" to 5 = "very high."

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○

Q7 It is necessary for me to correct surgical booking information due to inaccurate or incomplete initial surgical booking information.
On a scale of 1-5, with 1 being, "never", 5 being, "always"

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Q8 Considering the current surgical booking process, what would you like to see improved?

Q9 What do you use that you find helpful (or not helpful) in your surgical scheduling process?

Thank you for your time and contribution.

End of Block: Default Question Block

Appendix Q

Letters of Support from Agencies (redacted)

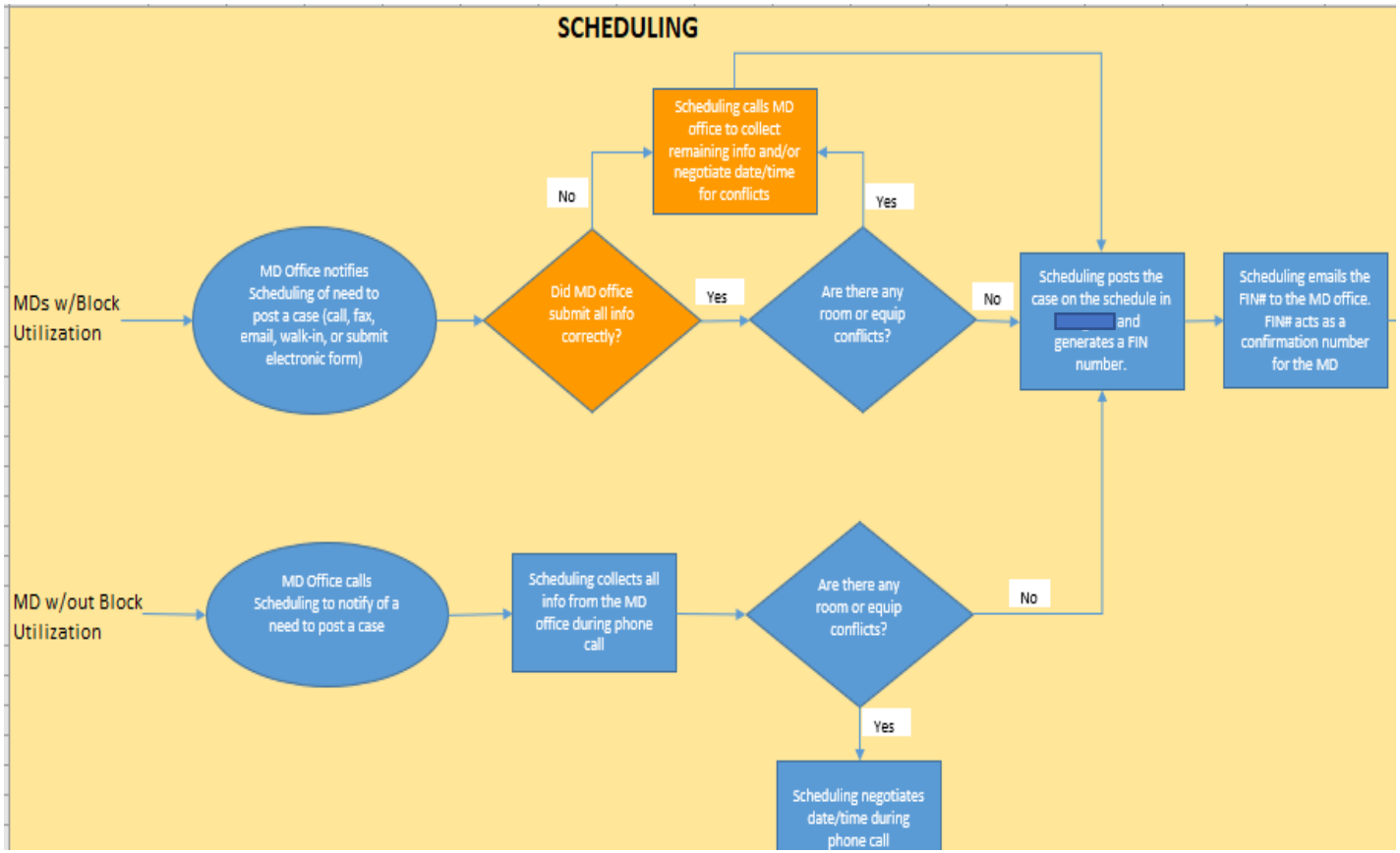
Data Use Agreement (redacted)

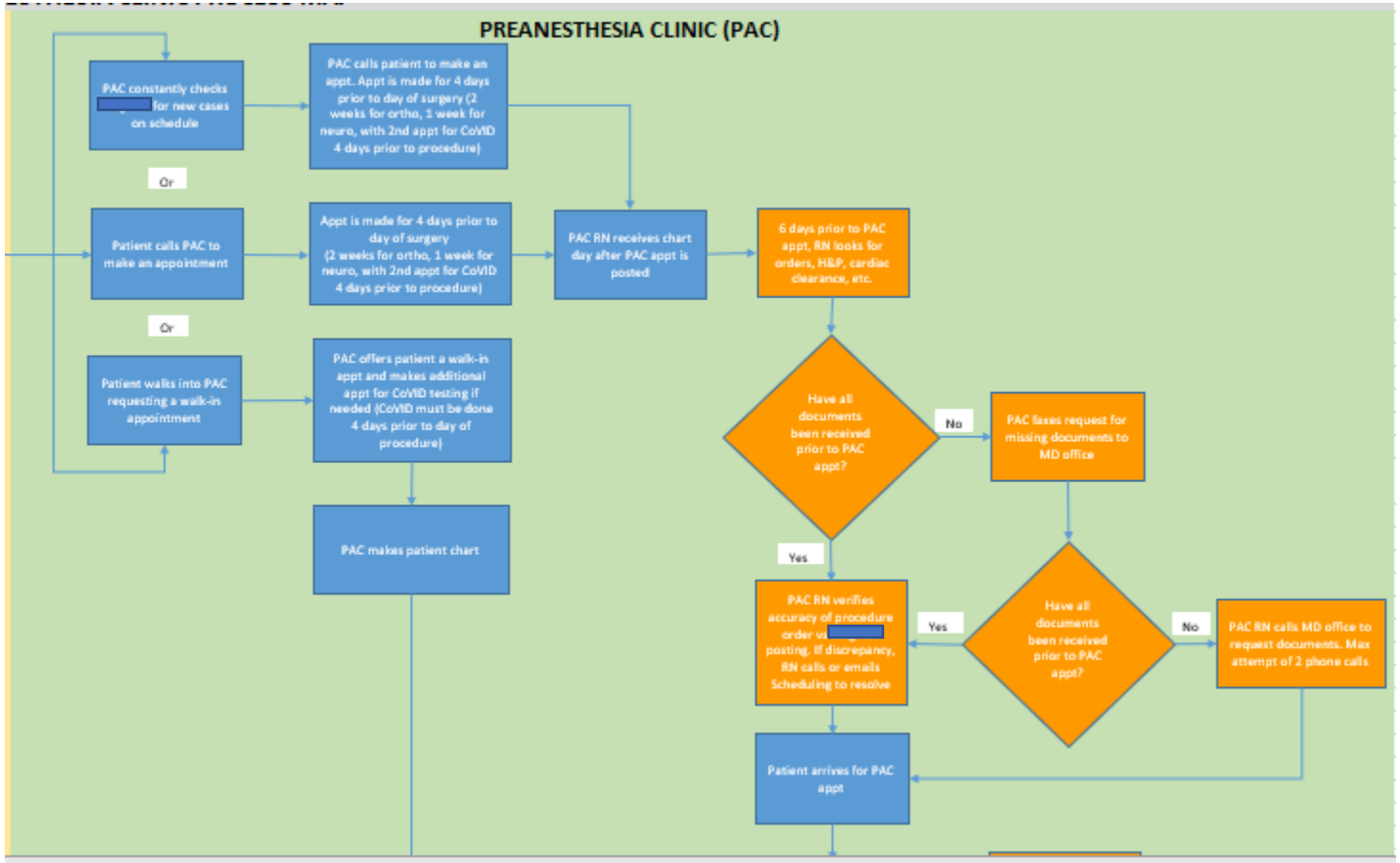
Appendix R

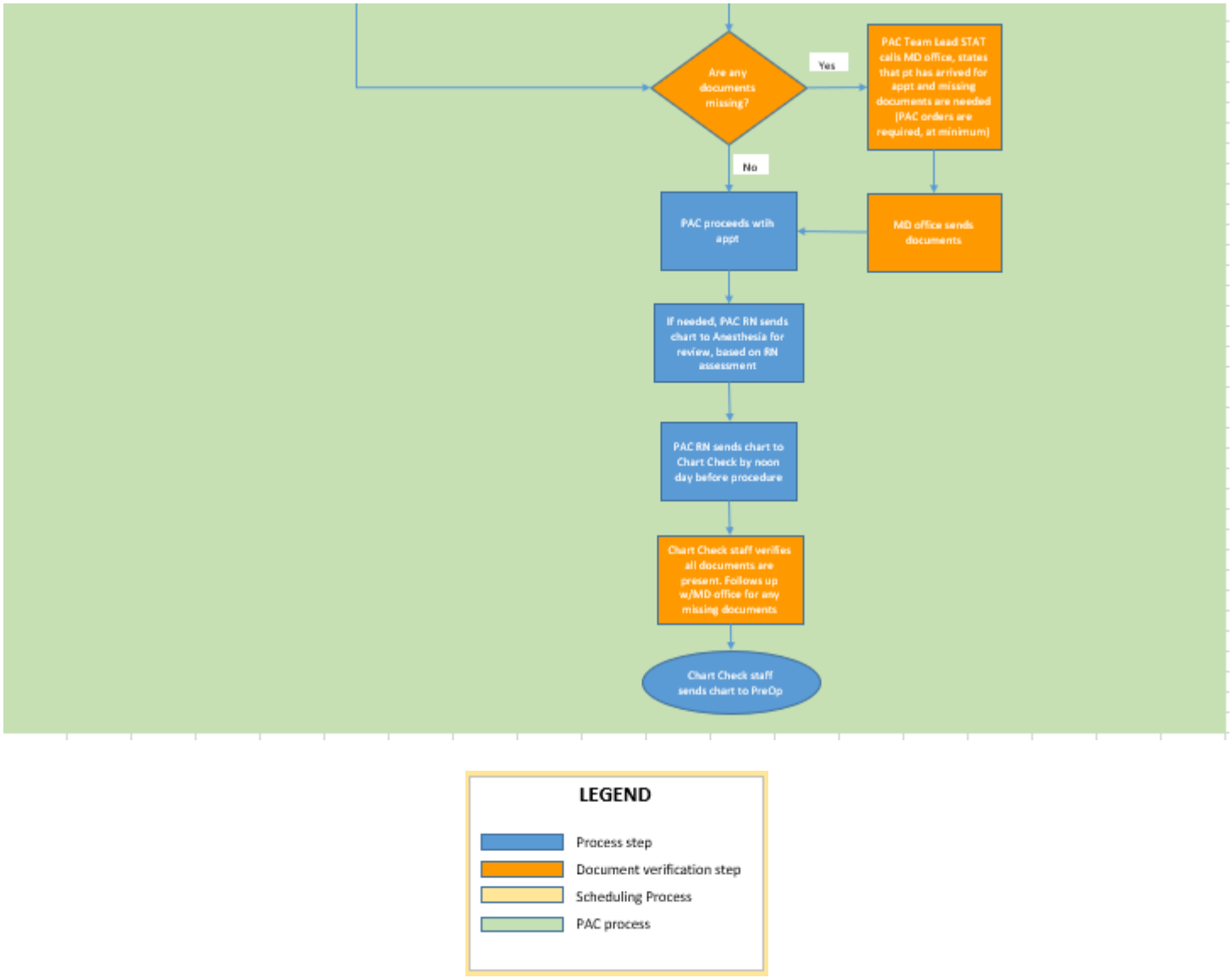
Targeted Solution Intervention Tools (redacted)

Appendix S

Surgical Scheduling/ Pre-Admit Clinic Process Map




PREANESTHESIA CLINIC (PAC)
PAC constantly checks [redacted] for new cases on schedule
PAC calls patient to make an appt. Appt is made for 4 days prior to day of surgery (2 weeks for ortho, 1 week for neuro, with 2nd appt for CoVID 4 days prior to procedure)
Or
Patient calls PAC to make an appointment
Appt is made for 4 days prior to day of surgery (2 weeks for ortho, 1 week for neuro, with 2nd appt for CoVID 4 days prior to procedure)
PAC RN receives chart day after PAC appt is posted
6 days prior to PAC appt, RN looks for orders, H&P, cardiac clearance, etc.
Or
Patient walks into PAC requesting a walk-in appointment
PAC offers patient a walk-in appt and makes additional appt for CoVID testing if needed (CoVID must be done 4 days prior to day of procedure)
PAC makes patient chart
Have all documents been received prior to PAC appt?
No
PAC faxes request for missing documents to MD office
Yes
PAC RN verifies accuracy of procedure order [redacted] posting. If discrepancy, RN calls or emails Scheduling to resolve
Yes
Have all documents been received prior to PAC appt?
No
PAC RN calls MD office to request documents. Max attempt of 2 phone calls
Patient arrives for PAC appt


Are any documents missing?
Yes
PAC Team Lead STAT calls MD office, states that pt has arrived for appt and missing documents are needed (PAC orders are required, at minimum)
No
PAC proceeds with appt
MD office sends documents
If needed, PAC RN sends chart to Anesthesia for review, based on RN assessment
PAC RN sends chart to Chart Check by noon day before procedure
Chart Check staff verifies all documents are present. Follows up w/MD office for any missing documents
Chart Check staff sends chart to PreOp
LEGEND
Process step
Document verification step
Scheduling Process
PAC process

Appendix T

Slide Presentation to Physician Offices

Pre-Operative Booking Form Standardization

- TWO SIMULTANEOUS PROJECTS:

1. [redacted] (Corporate) **Patient Experience Office** Project to Standardize current Pre-Operative Booking Form to **Improve Patient Experience**

-Most surgeries are scheduled over the phone, without any requesting documentation…then…

- **Patients** are sent to Pre-Admit Clinic with no orders
- Time spent (**patients** and Pre-Admit Clinic Staff) to obtain orders
- Time spent by surgery schedulers chasing required information to book surgical cases for **patients**
- Time spent calling back and forth to provider offices for surgical or **patient** information

Pre-Operative Booking Form Standardization

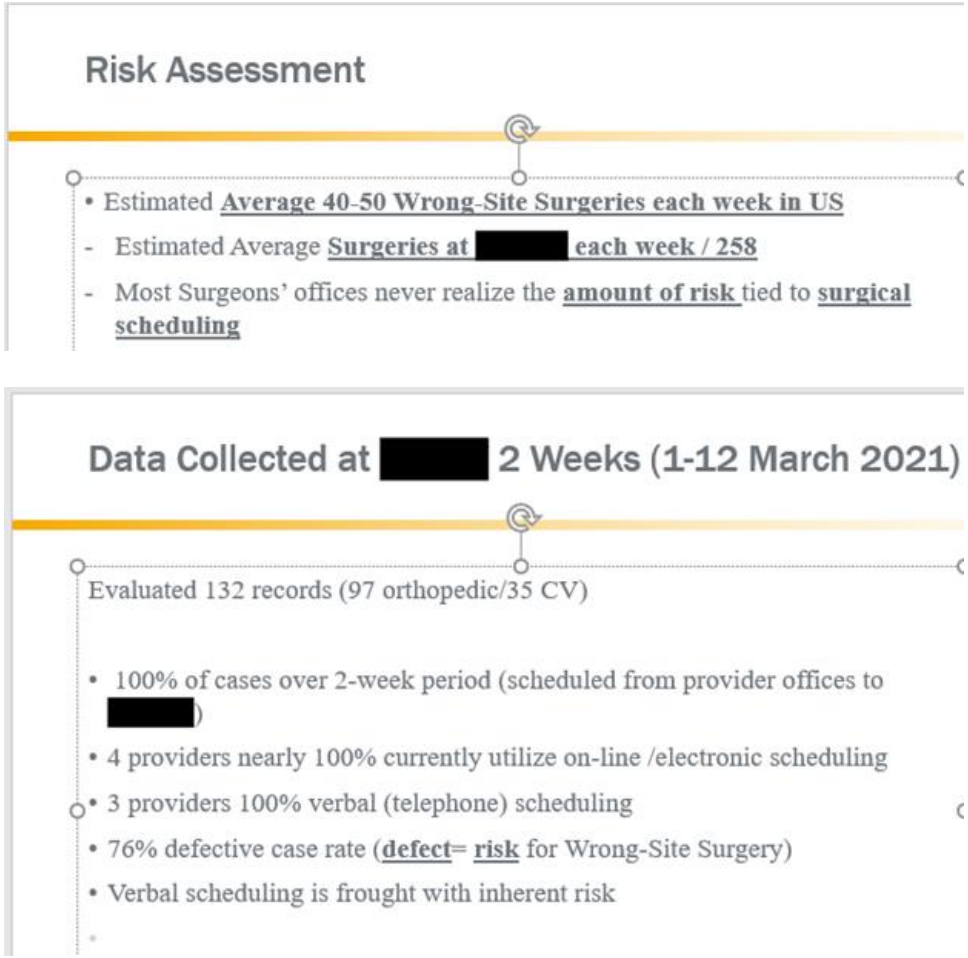
- TWO SIMULTANEOUS PROJECTS:

2. The Joint Commission Center for Transforming Healthcare's Safe-Surgery Targeted Solutions Tool ® (SS TST)

--Becky Poths DNP Student at [redacted] evaluating "risks" for Wrong- Site / Wrong-Procedure / Wrong-Patient surgeries utilizing this tool

Safe Surgery Targeted Solutions Tool ®

- Components of TST® for Safe Surgery:
- • Allows an organization to take a critical look at risks across its entire surgical care system, from the time a procedure is scheduled through the closing of the case.
- • Identifies specific risk points in **surgical booking**, pre-op or pre-op holding, and the operating room that could potentially lead to a wrong site surgery event.
- • **Standardizes practices** and **promotes consistency in perioperative processes** across multiple providers within the same organization.
- • Promotes **safe surgery practices** that are **critical to patient safety.**

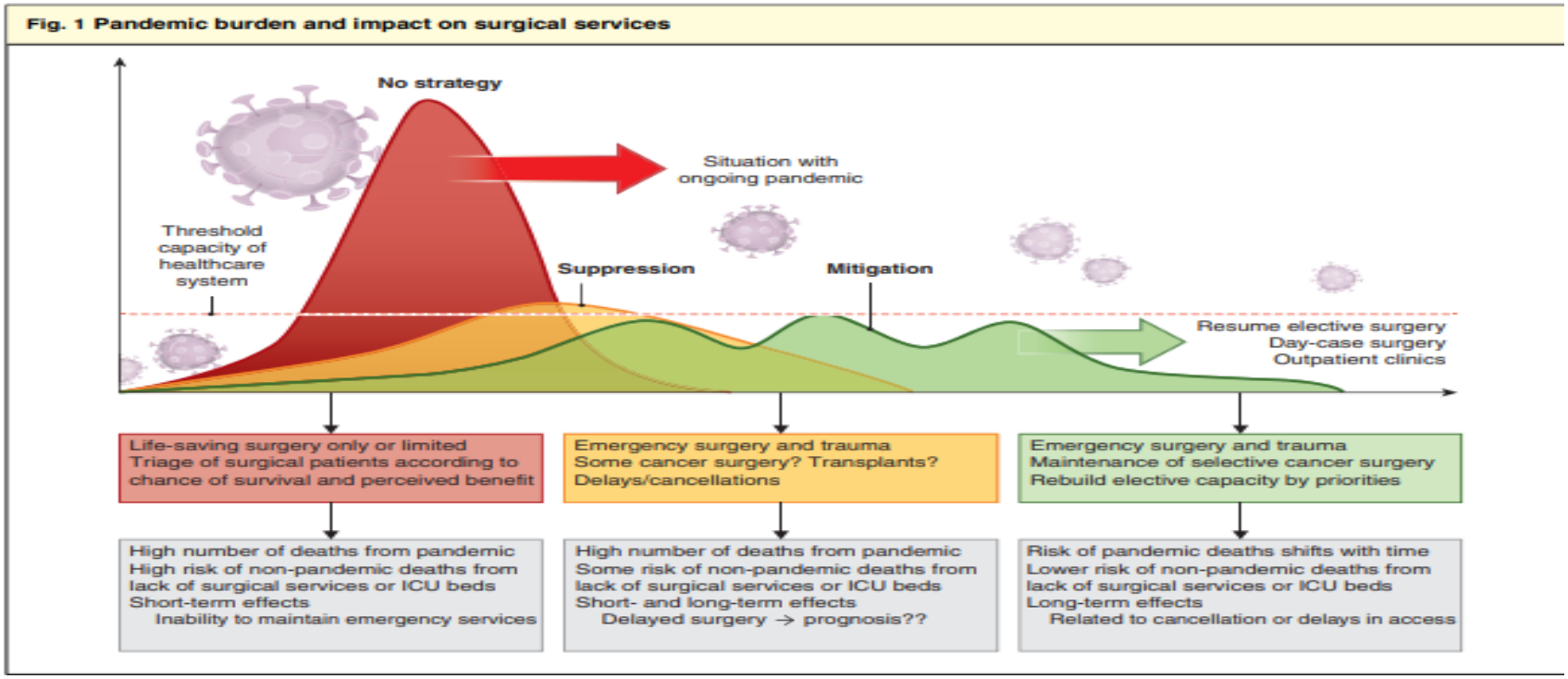

Risk Assessment
• Estimated Average 40-50 Wrong-Site Surgeries each week in US
- Estimated Average Surgeries at [redacted] each week / 258
- Most Surgeons' offices never realize the amount of risk tied to surgical scheduling
Data Collected at [redacted] 2 Weeks (1-12 March 2021)
Evaluated 132 records (97 orthopedic/35 CV)
• 100% of cases over 2-week period (scheduled from provider offices to [redacted])
• 4 providers nearly 100% currently utilize on-line /electronic scheduling
• 3 providers 100% verbal (telephone) scheduling
• 76% defective case rate (defect= risk for Wrong-Site Surgery)
• Verbal scheduling is frought with inherent risk

Way Forward

- Request participation from your pilot surgical scheduling offices (Ortho and CV) for [redacted] enterprise-wide patient experience and patient safety initiative
  - > Standardize pre-op booking process implement high-reliability tenets
  - > Eliminate verbal / telephone surgical scheduling, streamline process
    - Avoid having patients sent to Pre-Admit Clinic with no orders
    - Avoid time spent (patients **and** Pre-Admit Clinic Staff) to obtain orders
    - Avoid time spent by surgery schedulers chasing required information to book surgical cases (both office and hospital-based schedulers)
    - Avoid time spent calling back and forth between [redacted] and the provider offices
    - Achieve increased staff and patient satisfaction and decrease risk

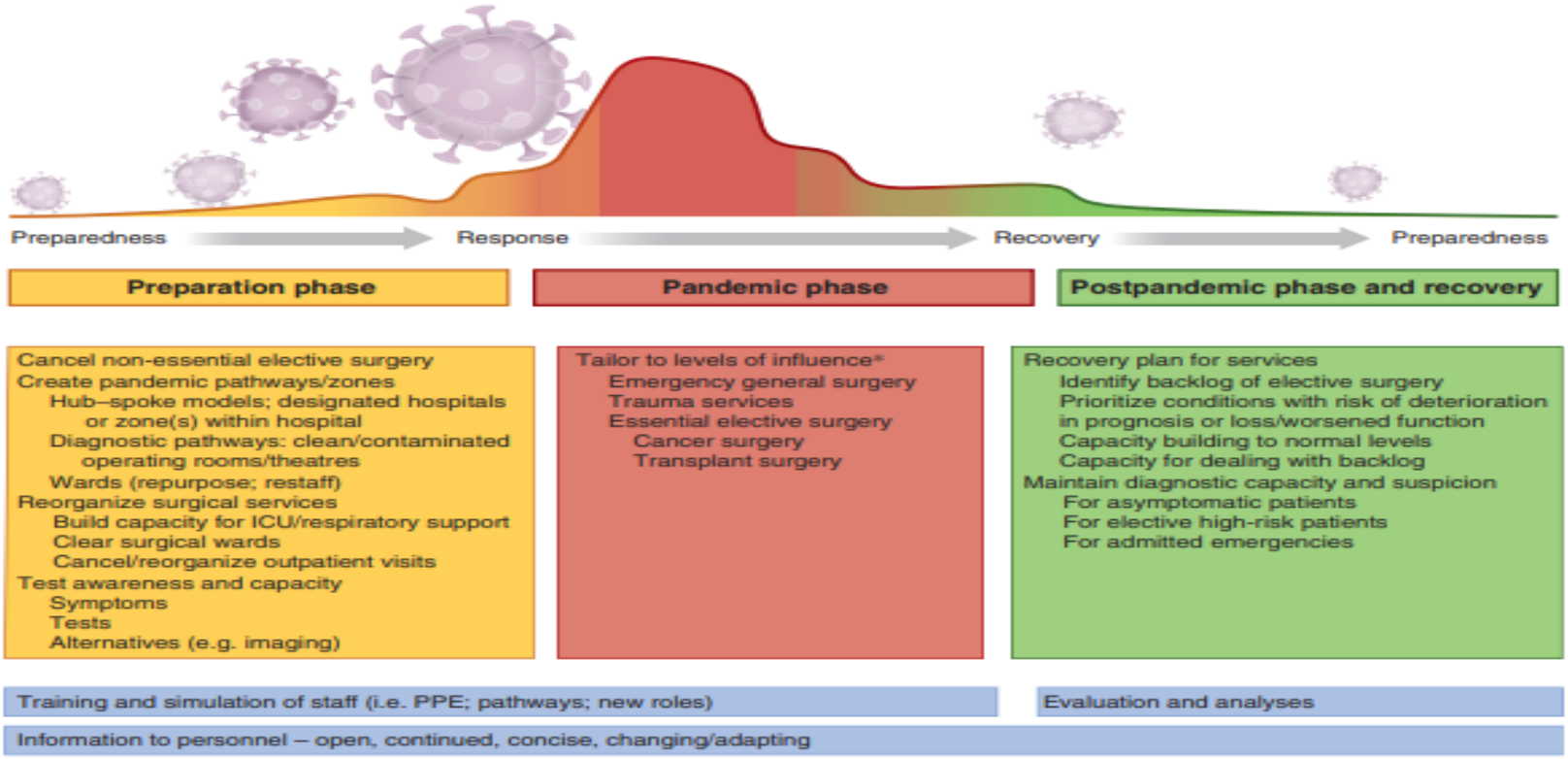
Appendix U

Pandemic Burden and Impact on Surgical Services Model



Søreide, K., Hallet, J., Matthews, J. B., Schnitzbauer, A. A., Line, P. D., Lai, P. B. S., Otero, J., Callegaro, D., Warner, S. G., Baxter, N. N., Teh, C. S. C., Ng-Kamstra, J., Meara, J. G., Hagander, L., & Lorenzon, L. (2020). Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *British Journal of Surgery, 107*(10), 1250-1261. doi: 10.1002/bjs.11670

Fig. 2 Proposed framework for surgical planning through pandemic phases



Søreide, K., Hallet, J., Matthews, J. B., Schnitzbauer, A. A., Line, P. D., Lai, P. B. S., Otero, J., Callegaro, D., Warner, S. G., Baxter, N. N., Teh, C. S. C., Ng-Kamstra, J., Meara, J. G., Hagander, L., & Lorenzon, L. (2020). Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *British Journal of Surgery, 107*(10), 1250-1261. doi: 10.1002/bjs.11670

Appendix V

IRB Exemption (redacted)

Appendix W

Statement of Non-Research Determination (redacted)